CANADIAN GEOGRAPHICAL JOURNAL

The Society's ambition is to make itself a real force in advancing geographical knowledge, and in disseminating information on the geography, resources and people of Canada. In short, its aim is to make Canada better known to Canadians and to the rest of the world.

As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography—historical, physical and economic—first of Canada, then of the British Empire and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young, as well as informative to the adult.

The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is three dollars in Canada.

The Society has no political or other sectional associations, and is responsible only to its members. All money received is used in producing the Canadian Geographical Journal and in carrying on such other activities for the advancement of geographical knowledge as funds of the Society may permit.

CANADIAN
GEOGRAPHICAL JOURNAL

This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustrations, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth and other parts of the world in which Canada has special interest.

The articles in this Journal are indexed in the *Reader's Guide to Periodical Literature* and the *Canadian Periodical Index* which may be found in any public library.

The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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North on the
Hudson Bay Railway

by LYN HARRINGTON
Photography by RICHARD HARRINGTON

IN THE PRESENT ERA as never be-
fore, Canadians are taking hold on their
empire to the north. Radio and meteoro-
logical stations are now located at strategic
points on the desolate islands and bays of the
Arctic and sub-Arctic. Splendid airfields
have been unrolled over the tundra, stations
on the Northeast Staging Route. Northern
names have become familiar on every
tongue. Scientists and sportsmen, tourists
and prospectors follow in the steps of the
explorer and fur trader of an earlier day.

From polished business desk or comfort-
able armchair, it seems a long long way to
Churchill, Canada's northernmost seaport.
The windy village, terminus of the Hudson
Bay Railway, is usually journey's end to the
tourist. But to men of the north, it is the
jumping-off place to the Eastern Arctic and
European ports.

Traffic has rolled over those ribbons of
steel to Hudson Bay for only sixteen years
but trade and commerce have flowed in and
out of the Bay for centuries. Imports ar-
rived in the holds of schooners—trade goods
of calico and thread, weapons and am-
munition, kettles, sugar and tea, all in
exchange for peltry.

With the progress of settlement along the
Red River in southern Manitoba, the in-
bound cargoes became more varied. Rustling
taffety for the ladies of Fort Garry, violin
strings and knocked-down pianos mingled
with crates of flowered china and bells for
pioneer churches. Each staunch little York
boat carried three tons of mixed freight in from

*At top:—The great grain elevator at Churchill silhouetted against the luminous night sky. Churchill
is almost in the land of the midnight sun and this photo was taken at 11 p.m.*

the Hudson Bay ports to the settlements. Bales of furs remained the single export.

Then came wheat.

As immigrants from Europe peopled the vast prairies and raised bumper crops of golden grain, an era of railroad building began throughout Canada. As early as 1885, agitation commenced in the west for a railway to Hudson Bay. From a seaport there, ships could carry grain to Europe by a route a thousand miles shorter than the great lakes route.

Survey parties went overland, searching out the best route. Sea captains tested out the northern shipping lanes. In the west, controversy raged over the best seaport. Eastern Canada remained largely apathetic. About a hundred miles of rail was laid, linking Hudson Bay Junction with the frontier town of The Pas. There the matter rested for years.

Not until 1910 was further action taken. Then the Canadian Government authorized the building of the first stages of the railway under government auspices. A bridge was flung across the wide Saskatchewan River. Contracts were let for construction of the railway. The right of way was cut through to the mouth of the Nelson River, where work on the harbour and townsite went on simultaneously.

Supplies of lumber and steel for bridges and construction were shipped from Halifax. With the outbreak of World War I came shortages of construction materials, of ships and manpower. After millions of dollars had been spent, work on Port Nelson was abandoned.

Steel rails had reached 332 miles northeast of The Pas. Great anchored cantilever bridges spanned the Nelson River at Manitou and Kettle Rapids, the only pieces of construction to survive the following ten years of neglect.

The Hudson Bay Railway is a step towards the realization of the hopes and dreams of the prairie peoples. It was their agitation which finally resulted in the completion of the line. From a narrow point of view, Saskatchewan and Manitoba had most to gain, but the benefit would be felt by the entire country. During the twenties, the

"On-to-the-Bay Association" waged an active campaign to push the work to completion.

The question of the seaport came up again. Upon the impartial recommendations of Sir Frederick Palmer of London, England, an eminent authority on port construction, Nelson was rejected as the terminus of the railway, and Churchill chosen. Work on the harbour there went on as the railway was repaired and finished. In 1929, steel reached salt water at Churchill*, though the line was not officially completed until two years later. Work on foundations for the elevator was begun in 1930.

The work of reconstruction of the neglected railroad is a tale of heroism and engineering genius. Ties had rotted, muskeg fills had burnt or blown away, iron had rusted, telephone poles had been heaved out of the ground by frost action. Methods never tried before in railway construction were now used, and the harsh attributes of the country were turned to advantage. Steel was laid over the frozen muskeg. Some thirty miles of duck mats, copied from those used on the battlefields of France, were laid down to permit construction gangs to reach their work over wet areas. Tripods were erected to support the telephone lines.

Almost as soon as the last spike was driven, two ships sailed for England with grain from the Churchill elevator. That the
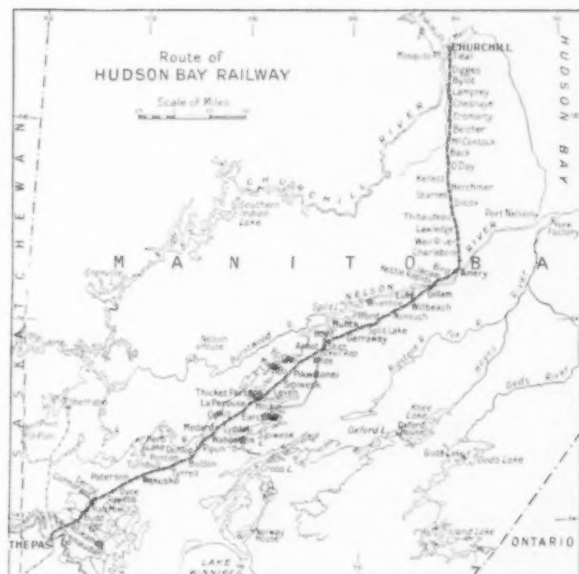
Route of
HUDSON BAY RAILWAY
Scale of Miles

Setting Lake, Wabowden, divisional point on the railway

"Windigo flags" fluttering over an Indian grave at Thicket Portage, Manitoba

port could not operate on a year-round basis was clearly recognized. However, the short open season was considered by western grain growers to justify the cost of developing and maintaining the port.

A journey up the line of the Hudson Bay Railway is one rich in colour, adventure and friendly contacts.* Slow or fast train, whichever you take is bound to be interesting. Passengers on a typical coach will include Indian families, trappers, miners, black-frocked priests, Mounted Policemen in sombre brown (not the famous scarlet for everday wear!), scientists and the ubiquitous commercial traveller.

A variety of service exists for passengers. During the winter a weekly mixed (passenger and freight) train, called in affectionate disrespect "The Muskeg Limited", crawls the 510 miles in three days. This is extended to bi-weekly service when conditions warrant. In summer an additional passenger train plies to the northern seaport twice a

*See "Our Historic Northern Route" by Eva Beckett, Canadian Geographical Journal, March 1941.

week, taking only twenty-five hours for the run.

Then each year in August, the Canadian National Railways, which operates the line for the Canadian government, runs its famous "sub-Arctic tour". It is invariably over-subscribed, most of the passengers being American tourists, though some are from Europe, Mexico and occasionally from Asia. The excursion train becomes a hotel-on-wheels for the week, providing not only transportation, but meals and berths and a recreation car for the passengers. The train makes long stops at various towns and mining centres, giving the tourists a taste of the north.

Many of the names of stations along the way recall memories from the history books. There's La Pérouse, named for the French admiral who captured Fort Prince of Wales on Churchill River. Button recalls Sir

The refuelling halt of Pikwitonei, at Mile 214

Thomas Button, an early navigator and explorer of Hudson Bay. Medard is for des Groseilliers, Radisson's partner in the fur trade.

Other names are taken from the fusion of initials and names, such as Wabowden,

Pikwitonei, a small pleasantly situated village on the Hudson Bay Railway

named for a chief engineer, W. A. Bowden. Jacam, for J. A. Campbell, and Luke for Luke Clemons, a well-known trader on the line, are others. Tyrrell recalls a famous Canadian explorer and scientist. Wekusko, Pipun, Sipiwesk and Matago are descriptive Cree words. Manitou and Kettle Rapids have earned their names through the really dangerous waters which boil underneath the bridges.

Immediately outside The Pas, the line plunges into thick forests. It winds north past lakes, past Indian villages, past marshes where wild fowl abound. For roughly a hundred miles, the country is heavily wooded, the soil a light overburden of clay or muskeg over limestone. Tamarack, spruce and poplar are the prevailing tree species.

The slow train pauses frequently to discharge freight, mail and passengers. The first village of any size is Cormorant Lake, and usually the Indians are out in their gayest raiment to meet the train. Youngsters scuffle and play with their dogs. Girls giggle and troop through the train for excitement, while it halts in the station. Oldsters hugely enjoy the passengers, finding the tourist as much a novelty as the tourist finds the Indian.

At Mile 82, the tractors haul in vast quantities of mining equipment to the new gold discoveries on Snow Lake, where a new town is already under construction. At Wabowden, the divisional point, the train halts overnight, while passengers race for the tiny hotel, or compose themselves to sleep on the hard seats of the colonial coaches.

Thicket Portage has two Indian graveyards where "windigo flags" flutter over the graves, indication that Christianity has not altogether blotted out ancient superstition.* Also at Thicket, beaver-holding pens are a recent development. "Nuisance" beaver insisted on damming up culverts, causing floods over the right of way and weakening the fills. An arrangement between the railway officials and the Game Branch of Manitoba resulted. Nuisance beaver are live-trapped by game guardians and transported into areas where their activities are appreciated.

From Ilford, farther north, a tractor train plies in to God's Lake, bringing out tons of whitefish. Ilford is also railhead for the winter freighting operations to the Knee Lake mining area. Many thousands of tons of freight, mining machinery, explosives and supplies have been hauled over winter roads to the mining fields.

Once across the Nelson River at Kettle Rapids, the railway swings due north. It is

*Editor's note:—There was a belief throughout the north that the windigo was a malignant spirit, manifesting itself in many different forms, which pursued and devoured the Indian.
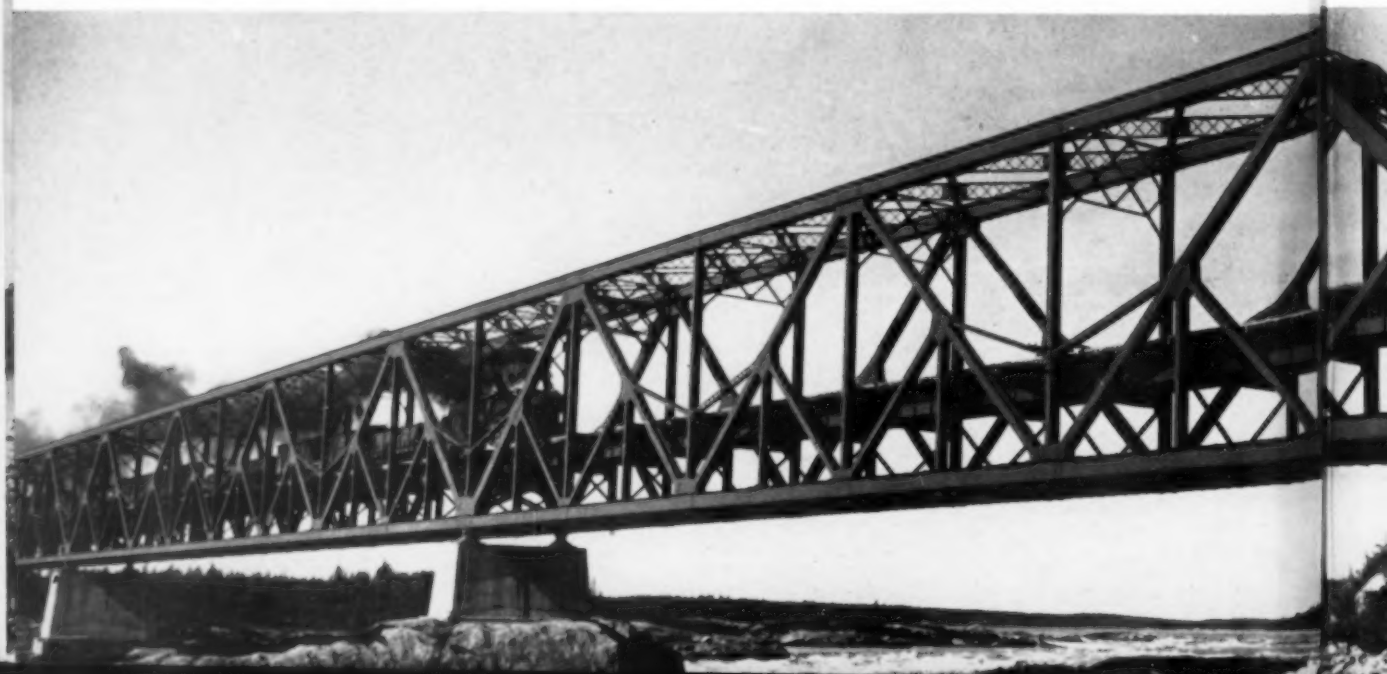
The turbulent Nelson River at Kettle Rapids, where it is crossed by the railway

155 miles to Churchill over perpetually frozen muskeg, relieved only by occasional stunted specimens of spruce and tamarack. Sloughs and lakes appear frequently, and

The "Muskeg Limited" on the 1,000-foot-long cantilever bridge which spans the Nelson River

occasional swift-flowing brooks. The great barren lands are reached about 60 miles south of Churchill—vast rolling plains of tundra.

Here and there may be seen piles of caribou antlers, bleaching in the sun, mute evidence of the migrating hordes familiar in the autumn. Sometimes the antlers ornament a solitary trapper's cabin.

The term "barren lands" is really an exaggeration, as close inspection shows berries and flowers growing in profusion.[*] Drifts of white Arctic cotton flourish around the sloughs, and wild flowers blossom in myriads of clumps—purple fireweed, white Labrador tea, and deep pink Indian paintbrush. Colour also appears in creamy reindeer moss, the grey of dead limbs and stumps, the ochre of reddish moss, interspersed with brown pools of muskeg water.

As the train nears Churchill, the gleaming

[*]See "Plant Life in the Churchill District" by Eva Beckett, *Canadian Geographical Journal*, August 1945.

A stretch of muskeg, in which may be seen occasional sloughs, at Herchmer. The telephone lines are supported by tripods in order to resist the action of frost.

The train pauses at the village of Herchmer, in the "land of little sticks".

Last vestiges of the "little sticks" at the edge of the barren lands

white grain elevator may be seen from a great distance across the flat country. To the traveller fresh from trees and lawns and flowerbeds, Churchill has a forbidding aspect. There is not a tree in the place to break the chill winds sweeping over the plains and sloping rocks. A few tiny kitchen-gardens have been painfully achieved, by gathering up a spadeful of earth here, another there. They must be built up from the frozen ground in order to produce any crops. But with long hours of sunlight the vegetables grow to extraordinary size.

Around the harbour and the docks, at the falling tide, white whales are to be seen feeding. They come very close to shore, dipping and rising as they cruise along, sending up fountains of spray as they rise to blow. This milk-white mammal is really a porpoise,

A trapper's home near Churchill. The roof is decorated with cast caribou antlers.

or beluga whale. Tourists find it great sport to hunt these aquatic animals, but it's everyday work to the trappers, who need the flesh and blubber for dog food.

Throughout the summer, as the trappers come in to the village they stake out their

Three ocean freighters can berth at Churchill's grain dock. The harbour tug and the H.B.C. ship "Fort Severn" in the harbour, which is three miles wide.
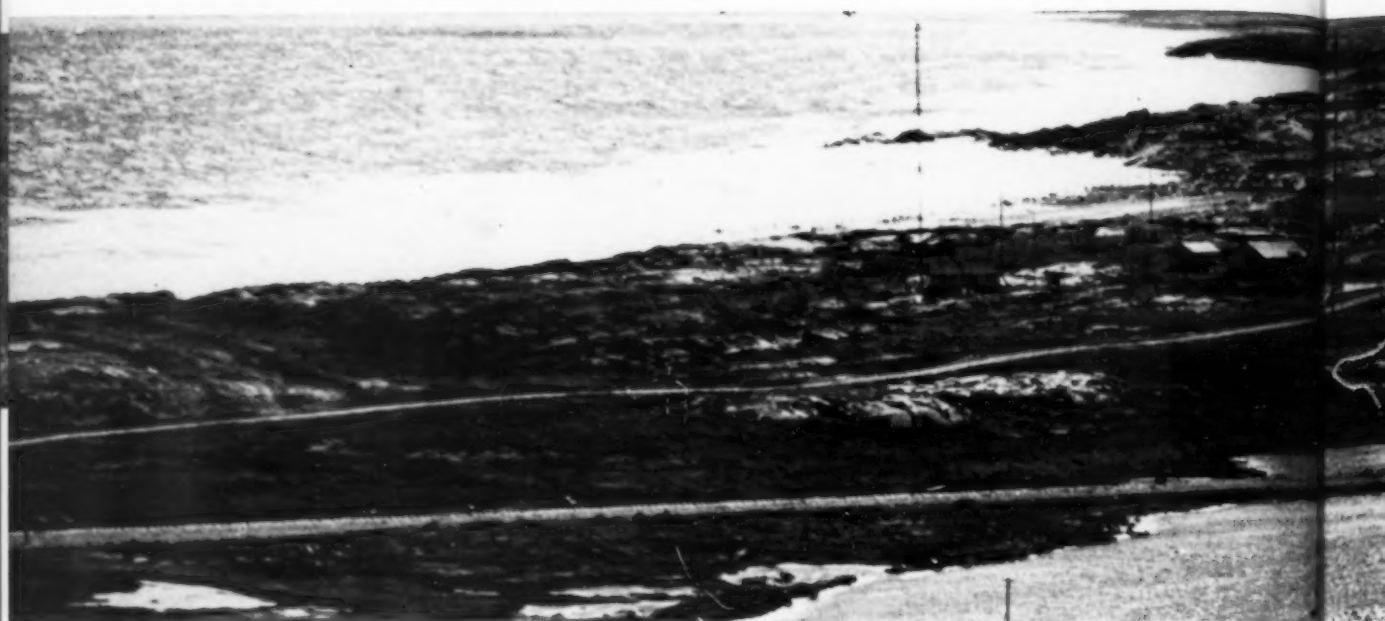
The village of Churchill seen from the top of the grain elevator, with Hudson Bay rolling in its breakers on the

huskies along the beaches. The mournful wails and yelps of these "Arctic nightingales" are so familiar that presently the mind grows dulled to their presence. When a shrill clamour breaks out, as if all the dogs were in deadly conflict, it merely means that food is on its way to them. One husky will set up a hundred answering choruses.

While the harbour was being built, the Dominion government maintained control of all the lands on Cape Merry, the eastern bank of the river mouth. When the construction work was finished, much of this land was handed over to the Province of Manitoba. The provincial area was laid out into streets and avenues, but there has been scant regard for these paper plans. It is distinctly difficult to adhere to town planning where springs and rocks keep interfering.

Churchill may look back more than three centuries to its beginning. Sailing vessels of the early explorers braved the menace of the ice floes to penetrate into Hudson Bay, thinking it was the water route to the Orient. In 1610, Henry Hudson steered his ship *The Discovery* into the unknown, and in the great bay ended his career, abandoned

by the mutinous crew who fled with his ship.

Jens Munck, the Dane, was the one to discover the excellent harbour of the Churchill River nine years later. But his discovery did him or his country little good. He spent one cruel winter on the river, a few miles up from the mouth. When the ice went out in spring, all but two of his men had succumbed to sickness and starvation. The survivors managed to get the smaller of their two vessels afloat, and to navigate it back across the Atlantic. They sailed away, never to return.

After his disastrous expedition, the river was ignored or forgotten for half a century. It was re-discovered by servants of the Hudson's Bay Company, and named in honour of the governor of the Company, John Churchill, later Duke of Marlborough. Half-hearted attempts were made to establish a white whale fishery at the mouth of the river. Twenty-eight casks of whale oil were the sole result, Churchill's first export.

James Knight, with twenty-five men, went to Churchill River in July 1717 to

...breaks on the rocky shore at the left. The towers of the radio station can be seen in the middle of the picture.

establish a post. Despite his discouragement, "For I never see such a miserable place in my life. Here is neither fish, fowl nor venison," he said, "but I believe it will be good for the Compys. interest in time", he and his men built a fort, from scraggy timber, on the site of the spot where Jens Munck's Danes had wintered.

With the well-known tenacity of the great Company, a fur trading-post was eventually set up at the mouth of the Churchill River. In addition, it was deemed wise to build a strong stone fort, in case the French should again attack British interests in the Bay. Starting in 1732, they were thirty-eight years building the substantial Fort Prince of Wales, yet it was lost in an hour.

For the French did come. In 1782, Admiral La Pérouse came sailing into the harbour with his three ships and 400 men. Governor Samuel Hearne, in command of the fort, felt his heart sink. He had only a tiny garrison, and the cannon were practically useless, after years of peace. Everything seemed to counsel prudence. On the Admiral's demand to surrender, a white tablecloth fluttered from the parapets.

The old fort looks much as the French left it, buildings blown to bits, rubble over the courtyard, cannon lying on their sides. They tried to blow up the massive walls, but made little impression on their forty-foot thickness. They too, were anxious to get away from the depressing spot. But time has healed the wounds, and flowers bloom in the crevices of the courtyard. The Historical Sites and Monuments Board has effected some slight restoration, and the fort is today a source of interest to visitors.

Samuel Hearne, respected as a brother in exploration and a great geographer by La Pérouse, was released with his men. In 1783 he was back re-establishing Churchill for the Hudson's Bay Company, building a new frame fort five miles upstream on the original site used by Munck and James Knight. Trade was carried on in this post until 1937. In that year new buildings were constructed in the village of Churchill, and the Company moved its operations across to the eastern bank of the river.

About a mile above Prince of Wales fort, is another relic of the early explorers, and servants of the great Company. Sloop Cove,

63

a tiny bay on the western shoreline of the river, is famous for the carvings in its granite—names of vessels and their crews, notably that of Samuel Hearne, and marks of men unable to write.

The cove also has grim memories of the Selkirk settlers of 1813. Tired and sick and hungry, they were hustled off ship at Churchill, instead of York Factory, their proper destination. They were left to spend the winter on the bleak spot as best they might. They were in no mood to leave their autographs on the rocks. Some of them did not survive to make the weary long trek to the settlements on the Red River shore.

Steel now links those thousand miles between Churchill and Winnipeg. For years, the railway failed signally to justify the hopes of its advocates, a strong argument against it in the minds of many Canadians. Those were the lean years of the depression, it must be remembered, when railroads operated at a loss. World War II followed immediately, during which no wheat could

Top to bottom:—

End of the rail haul—the gleaming elevator at Churchill

The neat, well built depot at Churchill terminus

The elevator is of most modern construction and can hold two and a half million bushels of grain. The long conveyor shaft carries the grain to the spouts for loading ships.

The surf of Hudson Bay creaming around the rocks of Cape Merry, the east shore of the river on which the village of Churchill stands.
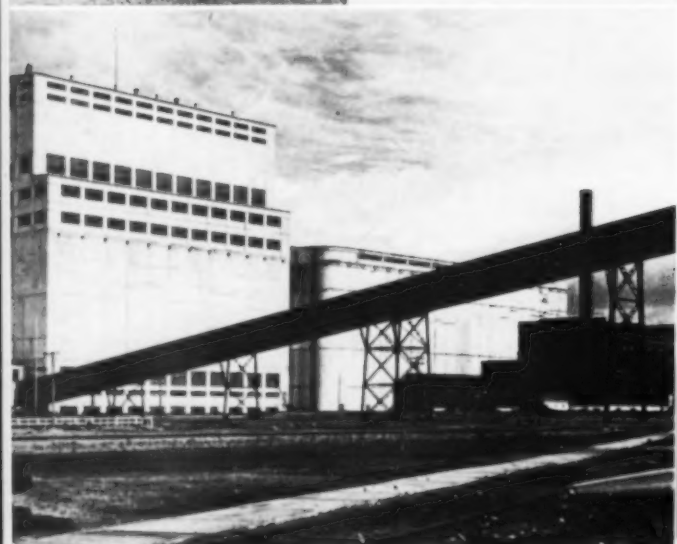
be shipped from the northern port, due to submarine activities.

During the war years, no freighters loaded at the port of Churchill. But the railway line carried more freight than at any time in its previous existence. The army camp, United States at first, later Canadian, required tons of supplies for construction and maintenance, and materials were freighted northward for building the vast new airfield. That camp is maintained, and from it travelled out Operation Muskox, exploring the secret fastnesses of the Arctic.

Trade out of Churchill has been resumed. "The war was hardly over before Saskatchewan's co-operative department had a mission overseas to interest co-operatives in shipping via the Bay. The Hudson Bay Route Association has been revitalized, and once again is busy in the interests of the port," wrote a western journalist. The Association claims that the 6 cents per bushel saving reported in 1939 by the Board of Grain Commissioners is much too low a figure. The Association estimates the saving in 1946 was close to 12 cents per bushel.

During August and September of 1946, nine grain ships cleared Churchill, loaded with grain for a hungry Europe. Some three million bushels of grain went into their holds, a good portion of it the current crop. Lumber and flour shipments were made on the same vessels. This is a trifling amount compared to the traffic that could operate out of the northern seaport.

The drawback is that the ships have rarely carried much inbound cargo. A two-way traffic of commodities is vital to the full use of the railway and port. To warrant ships putting in to Churchill, they must carry inbound cargo, china, twine, machinery. The high tide of imports was reached in 1935, with 2,580 tons of general cargo, window glass, bagged and bunker coal. The argument runs that western Canada cannot offer a large enough consumers' market for such goods; that some of the cargo might be of a timely nature, such as binder twine for the harvesting operations, is true, but relatively unimportant.

The Hudson Bay route offers the most direct passage not only to the Canadian

Old Fort Prince of Wales at Eskimo Point on the west shore of Churchill River. The outer walls of the fort have been partially restored to their 1781 appearance but the inner buildings remain as they were left after the French sacked the fort.

At left:—Chipewyan Indians, coming in to trade at Churchill, often set up their tents at Sloop Cove.

prairie provinces, but to the American Middle West, to British Columbia and to the Orient. Cargo shipped from Europe to the Orient must travel by way of the Panama Canal, or the Cape of Good Hope, or across the width of the North American continent to San Francisco—long hauls, all of them. The route by way of Hudson Bay, thence by rail to Prince Rupert, is considerably shorter.

More than a hundred ships have put in at the port of Churchill since 1931 with but two disasters (the S. S. *Bright Fan* which hit an iceberg and sank in 1932 and the S. S. *Avon River* which ran aground in a storm in 1936). Cargoes of grain and thousands of head of cattle have been shipped to Europe by this time-saving route.

In navigating Hudson Strait and Bay, captains now depend largely upon the gyro-compass, superior to the magnetic compass which is subject to polar disturbances. Radio and direction-finding stations have added greatly to the safety of the route, and it is believed that another two months of navigation could be added with the use of radar in avoiding the ice fields. There are hopeful signs that Canada's northern port will come into its own before long.

The future of the north is certain—but no one can time that development. "Productive lands and commercial forests are found to some extent at least," reported F. H. Kitto of the Department of the Interior. "In minerals, the region has startling possibilities, and great blocks of waterpower on all principal rivers await development. Fur-bearing and game animals, even after 250 years of taking, still maintain their numbers fairly well, and the fisheries, both salt and fresh, are extensive and varied."

The development of the prairies justified the faith of those early settlers who journeyed in by York boat. Events of the past few years have justified the dreams of their children. Who can doubt that the future holds even greater rewards, as the value of the railway and the Hudson Bay route become more widely known ?

Radio station and mounted police barracks are in sight and sound of the surf of Hudson Bay. The elevator, in background, is almost a mile beyond the other buildings.

THE END OF THE PORTAGE

"A portage trail climbs valley slopes where chequered shadows sleep,
And winds thro' stoney uplands and rolling burnt-land's sweep,
And creak of sweat-stained harness and rasp of iron-shod feet
Break hush of misty morning and noon-day's sultry heat;
But when o'er swamp and reeking fen night mists spread—soft and grey,
When booming call of lonely owl sounds knell of dying day,
Then sweat-dimmed eyes grow brighter when they see the ruddy glow,
And men bless flickering camp-fire in valley down below." *

S. C. ELLS

*From "Northland Trails" by S. C. Ells
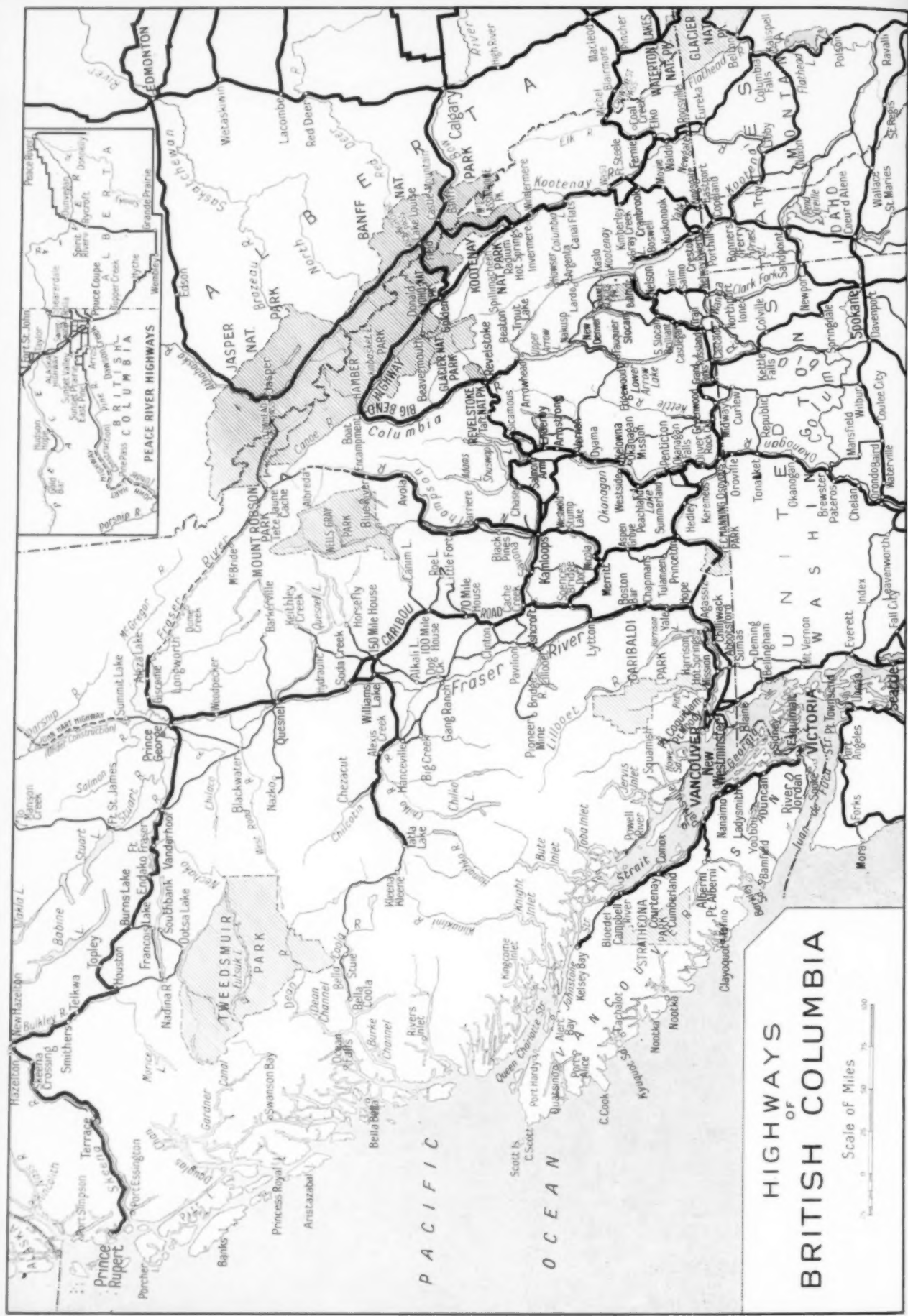
HIGHWAYS
OF
BRITISH COLUMBIA

Scale of Miles

PEACE RIVER HIGHWAYS

Highways of British Columbia

by ROBERT J. C. STEAD

ALTHOUGH third in area and third in population among the provinces of Canada, British Columbia has highway problems on a scale not reached by any of her sister provinces in the Dominion. The mountainous nature of British Columbia results in the province being cut into a series of high ridges and deep valleys, usually running in a north-south direction, which form natural barriers, almost impassable, to east-west traffic. During the early history of the area travel was mostly on foot or by pack-train over the high passes, and by canoe or boat along the rivers and lakes in the long narrow valleys. Such travel was slow, expensive, and dangerous, and the cost of the carriage of freight, except for highly concentrated values, was prohibitive.

The natural barriers between British Columbia and the other provinces were pierced by the construction of the main line of the Canadian Pacific Railway, completed in 1885, and the east-west life blood of Canada began to beat through Canadian arteries. Construction at later dates of the Canadian Northern Railway and the Grand Trunk Pacific Railway, both later absorbed in the Canadian National Railways, and the Crowsnest Pass and Kettle Valley Railways, gave the Coast a total of four railway lines connecting with the prairies east of the Rockies. So far as railways were concerned British Columbia's period of isolation was at an end.

Meanwhile considerable use had been made of the long, deep, narrow, and intensely beautiful lakes which are a feature of the interior of British Columbia. These are adapted to steamship travel, and developed importance both in freight and passenger service. The rivers of the province

Top:—Beginning of the Cariboo Road at Yale, showing Barnard's Express office. Photo taken about 1868.
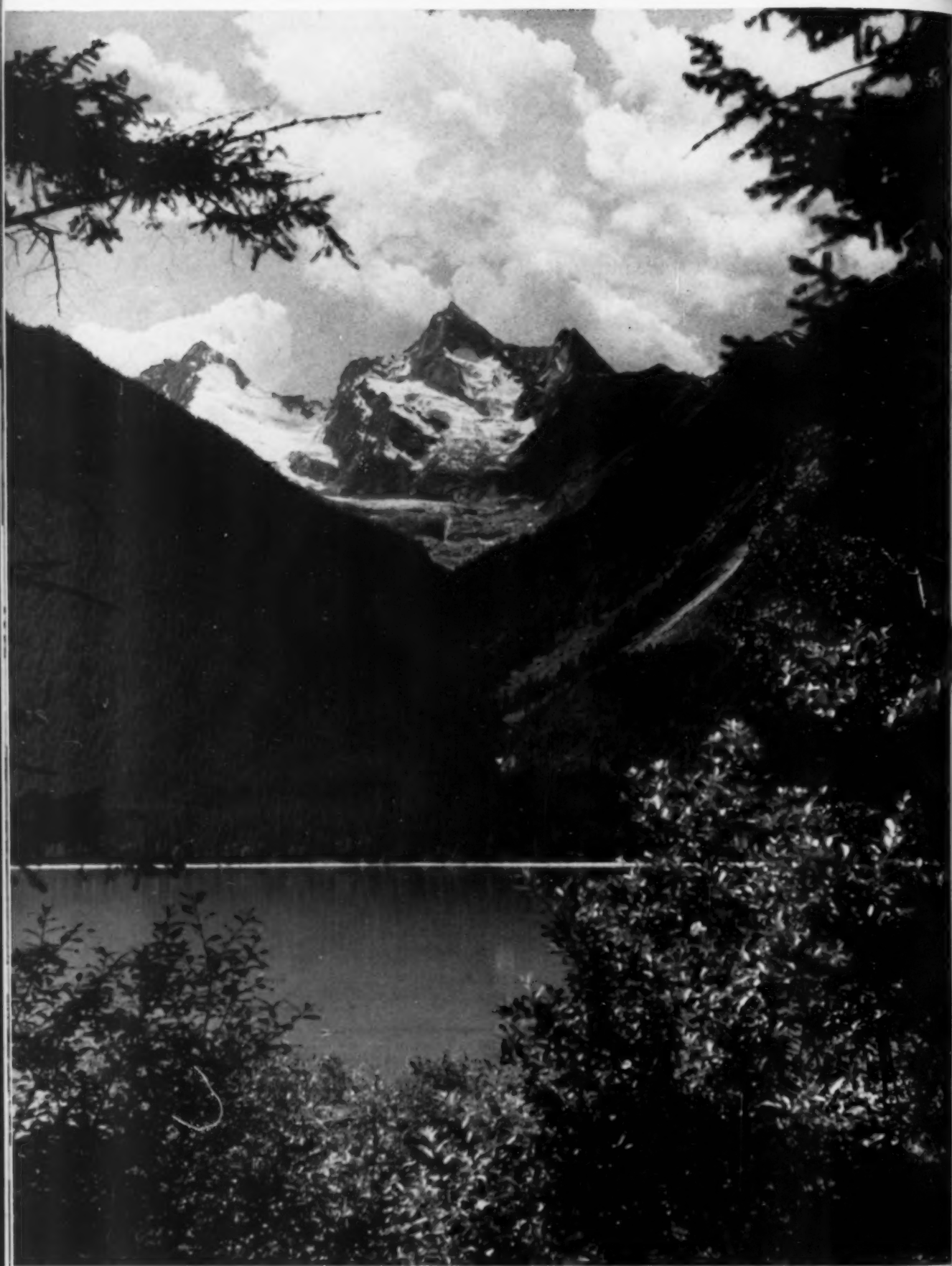
Mount Trident and Kinbasket Lake seen from the Big Bend Highway.

Suspension Bridge over the Fraser River near Lillooet. Bridge fits site perfectly, solid rock on both sides of the river for foundation and anchors, no high false work support in river for erection purposes required.

Anarchist Mountain near Osoyoos. Typical of a gravel road through the mountain section of British Columbia, forming part of the Southern Trans-Provincial Highway. This road will eventually be reconstructed and paved, to modern standards.

are for the most part too swift and too frequently interrupted with rapids and falls to be navigable for long distances.

The earliest large-scale attempt to build a road into the interior of British Columbia was made in the 1860's when the Cariboo Road was constructed to afford access to the Cariboo gold fields. This was a hazardous route, often little more than a trail, and with the collapse of the Cariboo gold field it fell into disuse. Other gold deposits, real or illusory, led to road construction in various areas, but it was the railways which made permanent, profitable settlement possible and in turn created interior trading centres dependent upon communication with each other and with the surrounding communities. In these centres a sporadic highway system took root, throwing out shoots and branches from a hundred unconnected places.

The Government of the province was not slow to recognize the importance of road construction if British Columbia were ever to become a cohesive and prosperous whole, and during the first decade of its history British Columbia spent nearly one-half of its revenues on roads. Construction was carried on under almost incredible difficulties; a single mile of road might easily absorb more labour and material than were required for scores of miles on the prairies east of the Rockies. No attempt was made at finished highways as the term is now understood, but by 1900 British Columbia had 5,600 miles of wagon roads, passable and suitable to the pioneer needs of the times.

Early in the present century a new element entered into highway requirements, not only in British Columbia but in all western countries. The coming of the auto-

mobile demanded an entirely new standard of construction. Here was a vehicle capable of great speed and service but demanding a roadway vastly superior to that which had been acceptable for teams and wagons. Not only did the new highways call for greater width, smoother surface, easier gradients and broader curves; they demanded a base which would stand up under high speeds and, as time was to show, under heavy loads. In facing her problem of providing good automobile highways, British Columbia not only had great obstacles but great incentives. No province in the Dominion presented such great physical difficulties; no province in the Domion offered such allure to the motorist and to the oncoming tide of tourists, the first waves of which were already beginning to break upon her rock-bound battlements. The motor tourist

was a new factor in the economy of the country, but British Columbia was not slow to realize that he was the forerunner of a new industry of almost inestimable importance. The "sale of scenery" is the most profitable of all enterprises inasmuch as it never exhausts the capital stock. Mines are worked out; forests are cut down; even agricultural land can be exhausted; but scenery, with proper conservation, is unimpaired forever. Here indeed was a new gold mine, richer than a hundred Cariboos or Klondykes, awaiting only the facilities for its profitable exploitation.

No provincial government has grappled with the problem of providing those facilities with greater energy or greater vision than has that of British Columbia. By the outbreak of World War II 20,000 miles of good highways had been built. The war inevit-

Tagham Hill, near Nelson, Southern Trans-Provincial Highway, showing standard main highway construction in West Kootenay district; roadbed 30 feet between ditches and providing for shoulder room and widening of pavement on curve. Bituminous mulch surface constructed by the Department of Public Works.

Slocan Lake from lookout

ably called a pause to this development, and not much more than maintenance could be done while the province carried its share of supplying men and materials for the conflict. But although little could be done in the way of new construction, even during the war the statesmen of British Columbia were looking ahead and planning for the future when peace should return. A Highway Board of competent engineers was established to study the highway needs of the province and present their findings in a well-defined program of future highway construction. This work was done in conjunction with the Post-War Rehabilitation Council.

A program estimated to cost $210,000,000 was submitted both to the Government of the province and to the federal authorities. It was designed to serve two purposes: to map out a program of public works in con-formity with a general over-all scheme, and to prepare in advance plans which could be put into effect if it became necessary to off-set a threatening period of recession. It includes nine major highway developments in British Columbia. As a result of the planning of the Highway Board, when hostilities ceased they had ready for immediate undertaking some 580 miles of highway construction. The engineers had done all the necessary location and survey work and had all specifications ready so that contracts could be called for at a moment's notice. Of this 580 miles, 441 miles have been put under contract and are now completed or in the process of completion. Immediately following the cessation of hostilities the Government had voted $1,500,000 in addition to the regular maintenance vote of $2,300,000 with which to carry out an extraordinary program of road maintenance. The same

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West arm of Kootenay Lake from Nelson golf course.

policy was followed in the succeeding year. In addition, in the fiscal year 1944-45 special provision was made through borrowing powers for $10,000,000 ear-marked for roads, and in the following year a further $500,000 for bridges. By the fiscal year 1946-47 the Government had provided more than $18,-000,000 for highway building and maintenance. From these figures may be gathered the energy with which British Columbia is grappling with her highway problems.

Since September, 1945, twenty-seven road grading contracts have been awarded covering 415 miles of highway. The main projects included are the Pine Pass Highway, for which contracts have been let for 206 miles, and the Hope-Princeton Highway, which is 83 miles in length. Of the total mileage contracted for, grading has been completed on 177 miles, but not all of this has yet been opened to traffic. The extent and nature of these contracts can be judged from the fact that they involve more than 12,000,000 cubic yards of excavation. Of the twenty-seven road projects referred to seven have now been completed. Contracts were also let for three permanent steel bridges on the Hope-Princeton Highway.

These undertakings have been carried out, or are on their way to completion, notwithstanding difficulties which, while not peculiar to British Columbia, have borne heavily upon that province. They include the difficulty in securing adequate equipment, shortage of construction material, shortage of man-power, and scarcity of skilled technicians. It may be interesting to set out in some detail just what these difficulties mean. Out of thirty-five power graders ordered, only seven had been delivered a year later. Of twenty-six tractors and bulldozers ordered only eight had been delivered. Of four

Protection wall on the Okanagan Highway at Penticton. This is a low-lying section of highway subject to flooding during high water period of Okanagan Lake.

Okanagan Highway. Powers Creek Bridge, So... pile trestle bridge construction with deck wi...

hundred and fifty-nine motor trucks used in maintenance one hundred and twenty-six have been in service for ten years or longer, and some have been in use for nearly twenty years, and of one hundred and forty-

six tractors one hundred and two have been in service for fifteen years or longer, and fourteen have been in service for over twenty years. Of twenty-seven shovels twenty-two have been in service for at least seventeen

Haslam Creek, Trans-Canada Highway. Steel tied arch, 133-foot span; reinforced concrete deck, roadway 24 feet wide. Fits the site admirably and of graceful and pleasing appearance, typical of modern bridge design now being adopted by the province.

Sandy Cove Bridge, Marine Drive, We... Vanca... struction. Steel beam bridge with reinf... con... 5-foot sidewalk. Total length is a 140 ft; cen... supported on concrete piers. The two aspans, at either end of the bridge, are each... feet la...

Creek Bridge, South Okanagan. Standard creosote ... n with ...ck widened out on account of curve.

Okanagan River trestle bridge near Oliver, Southern Trans-Provincial Highway.

years. Consideration of these facts may tend to make motorists and the travelling public somewhat more patient with highway authorities who are doing a good job in the face of almost insuperable difficulties. The Government of British Columbia has added half a million dollars to an equal sum voted a year ago for the purchase of new machinery.

During the last year an average of 1,800 men, many of them returned veterans, were

...ve, West Vancouver, modern in design and con-... reinforced concrete deck 24 feet wide and one ... a 140 ...t; centre span is 70 feet long and is ... two ...spans, supported on concrete abutments ... each ... feet long.

Midway Junction. An example of Howe Truss span construction bridge due for early replacement.
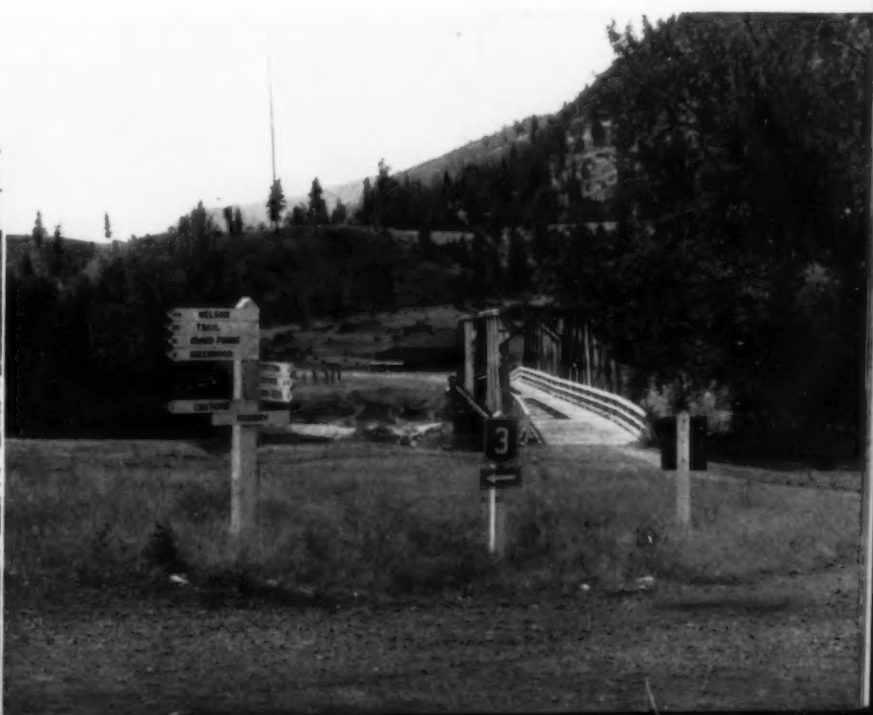
Lions Gate Bridge which spans the entrance to the harbour between Vancouver and the north shore of Burrard Inlet.

Photos by G. M. Dallyn

employed on highway projects. To provide for increased traffic across Kootenay Lake on the Southern Trans-Provincial Highway a modern Deisel power ferry was built and launched at Nelson and will be in service this year, and new steel barges were placed in service at Castlegar and Long Beach-Harrop. Of the 441 miles put in hand 232 miles are new construction and 209 miles reconstruction. In addition, $765,500 has been spent on new ferries.

The first consideration of the Government is the industrial development of the province, for on that depends the livelihood of the people and the opportunities that are created for young men and women. British Columbia has approximately 22,500 miles of highways, roads, and bridges to maintain in a country of exceptional physical difficulties; no little task for a population of barely a million people. It is now government policy to improve and maintain existing highways by reconstruction, and to build only those new roads that genuine settlement and industrial needs demand. These roads must accommodate more than 146,000 motor vehicles registered in the province, in addition to a vast and rapidly growing tourist traffic. (In 1946 more than 178,000 tourist cars entered the province.) In addition to other expenditures the Government proposes to spend $2,250,000 on the hard surfacing of highways, this amount to be derived from the three cent gasoline tax relinquished by the Dominion but retained by the province.

A glance at the map of British Columbia indicates some of the major highway needs of the province. For many years there was no automobile road through Canadian territory connecting the western part of British Columbia with the prairies. The principal gap that had to be bridged was known as the Big Bend of the Columbia River. That magnificent river, rising in Columbia Lake in the western foothills of the Rocky Mountains, flows northward through the Columbia Valley to the Big Bend, where it makes an abrupt turn and flows southward 270 miles to the International Boundary. On its nor-
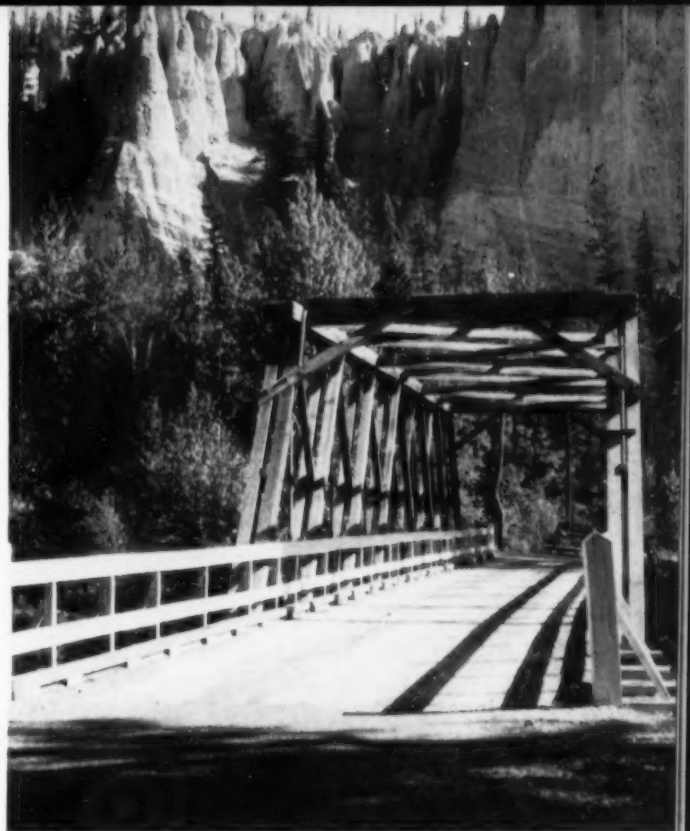
Dutch Creek Bridge, Columbia District. One of British Columbia's older bridges of the Howe Truss type, due for replacement under the Government's highway expansion program.

thern course it is crossed by the main line of the Canadian Pacific Railway near Golden, and on its southward route it is again crossed by the railway at Revelstoke. Between these two crossings the river makes a loop of approximately 193 miles, although the railway distance from Golden to Revelstoke is only 91 miles. To have built a highway paralleling the railway would have presented almost superhuman engineering difficulties; the railway overcomes them by means of a five-mile tunnel and by crawling around precipitous mountain sides where a highway could have been built only at prohibitive expense. Highway engineers therefore decided to follow the route of the Columbia River, which, while a hundred miles longer, avoids much of the expensive and hazardous construction which otherwise would have been necessary, and at the same time opens to the motorist a route of amazing beauty and of much historical interest.

The motorist travelling eastward, after

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having negotiated the magnificent and sometimes hair-raising Fraser Valley and Fraser Canyon, follows the Thompson River to Kamloops, skirting the beautiful Kamloops Lake; thence along the South Thompson River to Shuswap Lake, and from Salmon Arm northeastward to Revelstoke. Revelstoke is a railway centre of importance, but to the tourist the chief interest is the breathtaking scenery, the fact that it is the gateway to the Big Bend Highway, and also that it commands entrance to Mount Revelstoke National Park. A good highway of some 20 miles leads up to the summit of Mount Revelstoke, in the national park, where an elevation of 6,350 feet above sea level is reached commanding a scenic panorama surpassed in few places in the world. This trip, while it presents a detour from the direct course of the through-bound motorist, is well worth the time it takes.

Returning to Revelstoke, we plunge at once into the Big Bend Highway, which follows the Columbia River upstream for 193 miles. For most of this distance it parallels the river closely along a route cut out of heavy timber and commanding vistas of great mountain beauty. The country is as yet little developed, but the building of the road closed the last gap in the western half of the Trans-Canada Highway and it will eventually become a great artery of travel between British Columbia and the provinces east of the Rockies. At Golden it joins an older provincial highway which connects with the highways in Yoho National Park. Another route, continuing southward along the Columbia Valley, connects with the highway system of the United States.

Although not part of the British Columbia highway system, the Banff-Jasper Highway is so closely associated with it that brief reference may be made to it in this article. The Trans-Canada Highway continues eastward through Yoho National Park, crosses the Great Divide at the boundary line between British Columbia and Alberta, and at Lake Louise station connects with the Banff-Jasper Highway, which follows a deep trench in the Rocky Mountains northwest-

ward to Jasper, a distance of 149 miles. Along its route it commands some of the finest scenery in the Rockies. At Jasper it connects with an east-and-west highway which eventually will lead, at its western extremities, to Prince Rupert and Vancouver.

In the northeastern part of British Columbia is a great and fertile area consisting of a large section of what is known as the Peace River District. This area lies to the north and east of the Rocky Mountains and has the geographical and climatic characteristics of northwestern Alberta. Its only railway connection at present is with Edmonton, and its highway facilities, except for the Alaska Highway, which will be discussed later, are almost equally restricted. A western outlet to this area, to be known as the "John Hart Highway" (in recognition of Hon. John Hart, Premier of British Columbia), is to be driven through with as little delay as possible, and will afford another important artery and feeder of traffic to the highways in the older sections of the province.

Perhaps the most romantic of all highways in British Columbia is the long section of the Alaska Highway which penetrates its northeastern and northern fastnesses. This highway was, of course, a child of the war. After Pearl Harbour, when it became apparent that Alaska might be seized by the Japanese and used as a base for the invasion of Canada and the United States proper, agreement was speedily reached between Canadian and United States authorities for the building of a military highway through Canada which could be used should the ocean route up

Top to Bottom:—

Vancouver Island Highway at Oyster Bay, near Ladysmith, showing roadway widened out on curve and standard protection fence; typical of construction planned for entire Vancouver Island Highway.

Malahat Drive, Island Highway. One of the newer sections of reconstructed highway at Rough Creek, providing for 24-foot bituminous mulch pavement with plenty of shoulder room.

Southern Trans-Provincial Highway at Moyie Lake. Reconstruction carried out some years ago is typical of main highway construction at that time through the Kootenay districts. Surface is of bituminous type.

Southern Trans-Provincial Highway, Nelson-Creston district. Bituminous type surface constructed some years ago.

the west coast of British Columbia become impracticable because of enemy action. Fortunately this situation did not develop, but in the meantime the Alaska Highway was pushed forward with the greatest energy*. Under the agreement between the two governments the United States was to build the highway between Dawson Creek and Fairbanks, to pay all construction costs, and to maintain it for a period of six months after the war, at which time it was to become the property of Canada. Construction began in the spring of 1942, and except for

*See "Alaska Highway" by S. C. Ells, *Canadian Geographical Journal*, March 1944.

one section which could be used only when the road was frozen, the pioneer road was passable within eight months. The highway proper, however, which is 1,523 miles in length, was not completed until November, 1943, and even then one or two major bridges were still under construction. Much publicity attended the building of this road, especially in the United States, and there was something glamorous about the idea of driving from any point in the Republic right through to Alaska. With the passage of time and the coming of a more realistic

Kootenay Lake. Fraser Landing near Nelson, showing the old stern-wheel ferry boat Nesookin, *recently replaced by the new motor vessel* Anscomb *which operates on a shorter route and provides improved service.*

Metchosin Road, Vancouver Island. Typical example of reconstruction of highway leading to a farming area on the island.

Gas shovel operating on the Trans-Canada Highway, east of Golden.

view the difficulties attendant upon such a trip became more obvious: the immense distance involved, the lack of tourists' and subsistence facilities along the way, and the fact that a military road may not be an acceptable tourist highway, began to receive their proper weight in the public imagination. Nevertheless, the road is there; it penetrates a vast area of northeastern and northern British Columbia, and although its maintenance is a Dominion responsibility it cannot be left entirely out of the British Columbia highway picture.

Long Beach Highway at Harrop Ferry, west arm of Kootenay Lake.

No article of magazine length can attempt to give a detailed description of the highways of British Columbia, and the few which have been mentioned herein are in the nature of samples rather than an all-inclusive statement. The topography of British Columbia, with its high mountain ranges, its deep, narrow, fertile valleys, its magnificent lakes and its terrific rivers is such that the generalizations which might be applied to the highways of any other province are impractical and inadequate. There are stretches of easy road-building along valleys and over plateaux; stretches of extremely expensive rock work through deep defiles or around mountain ridges; bridges over canyons dry or nearly dry for much of the year but raging torrents at flood-time; ferries and waterway connections where bridges and roads are impracticable. Notwithstanding these obstacles, which are the pride as well as the problem of the province, the Government of British Columbia has applied itself with such energy to the task in hand that excellent roads connect the principal centres, and good highways extend in many instances into remote areas. The highways on Vancouver Island, the interior artery from Lytton through Williams Lake to Quesnel and Prince George, the highway bisecting the province from east of Prince George to the west coast at Prince Rupert, the numerous routes down the southern interior valleys connecting with each other and with the highway system of the United States, are all examples of what has been

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Cariboo Road at 150 Mile Creek. Long sections of this road are now being reconstructed to modern standard, under the highway expansion program.

done or is being done to make the unexampled beauty and material resources of British Columbia available to the motorist in search of health and pleasure and to those who travel on business in search of trade and commercial opportunity.

That this work will be continued and pressed with even greater vigour there is ample assurance. During the fiscal year 1946-47 the British Columbia Government had under way forty-two major projects involving 441 miles of new highways costing $13,444,277, bridges costing $617,192, and ferries and landings costing $765,472. Of these forty-two projects seventeen had been completed by the spring of 1947. During the fiscal year 1947-48 the plans of the Government include another forty-four major projects, some of which, however, will not be completed until 1948. These are reconstruction projects planned to bring the highways, in gradients, curvature and surfacing up to the most rigorous standards demanded by the modern motorist. In addition there is a plan for the replacement of major bridges involving sixty-six structures and costing an estimated $3,154,000. There will also be 125 miles of entirely new paving, 70 miles of resurfacing, and 170 miles of flush coating on existing paved highways requiring treatment. Much of the new pavement will be of a better type than has heretofore been possible.

A point of considerable contention in some provinces is that revenues from motor car traffic go into the general treasury and are not all expended on highways. Dealing with this subject in the British Columbia Legislature, Hon. E. C. Carson, Minister of Public Works, said:

It has been said that our roads would be in much better condition if all revenues collected from motorists were spent on highways, bridges, and ferries . . . I now propose to present figures which I have taken time to secure to inform our motorists that they are not only getting back on highways what they have paid in by way of gasoline tax, motor licences, drivers' licences, etc., but substantially more. In other words, the motorists are today receiving services by way of highways, ferries and bridges in greater amount than they themselves are financing. In this connection, therefore, I would like to present the following figures: Expenditures, 1944-45, $7,513,000; revenue from vehicle licences, gasoline tax and motor carriers, $6,698,000; excess of expenditure over revenue, $815,000. For 1945-46, expenditures, $8,214,000; revenue, $7,559,000; excess of expenditure over revenue, $655,000. The figures for 1946-47 can only be anticipated. Revenues are expected to total $9,215,000. Expenditures so far are $9,261,000, thus showing an excess of expenditure over revenue of $46,000 . . . These figures do not include costs of administration, which for 1946-47 are estimated at $742,000.

The acceptance of the principle that all revenues received from motor traffic, and more, shall be spent on the highways is an index of the importance which the Government of British Columbia attaches to highway development in that province.

Highway construction in British Columbia has a three-fold aspect and significance: it furnishes the local population with facilities for passenger transportation; it provides means of moving commodities between centres not conveniently served by railways; and it facilitates and encourages tourist travel. Which of these is the most important it might be difficult to say. The topography of British Columbia, with its mountains, rivers, and lakes, has a tendency to isolate settlement from settlement—a tendency not to be encouraged in a province wishing to build up a strong feeling of community association. Therefore, while it might ordinarily be regarded as a minor aspect, the fact that the highways permit and encourage the population to move about freely from com-

munity to community, and from smaller communities to larger centres of population such as Vancouver and Victoria—and *vice versa*—may be of major importance in weaving that warp of understanding which is essential to a strong provincial or dominion fabric. Except for quite remote localities, isolation has been removed, and with isolation goes the isolationist. The importance of this interweaving of population, not only in British Columbia but in all parts of Canada, has perhaps never been adequately emphasized. It tends to break down local prejudices and suspicions and to promote a public opinion based on association and goodwill.

As a means of commercial transportation the highways are also very important. British Columbia, for example, ranks first among the provinces of Canada in the production of fruit. This is a commodity which demands speedy and appropriate transportation from orchard to packing plant and from packing plant to railway. The part played by the highways in making this transportation possible is a very important one indeed. Other products of the farm, the mine, the forest, and the sea, although in their nature perhaps less urgent than fruit, are moved over the highways quickly and economically, to the advantage of both producer and consumer.

But it is in their contribution to tourist travel that the highways of British Columbia play their most spectacular role. No other province is so endowed with those allurements of majestic scenery, accessible remoteness, and impressive natural surroundings as is British Columbia, and it is naturally already one of the great tourist centres of the Dominion. Good highways connect at half a dozen points with the highway system of the United States, affording means of entry to the thronging thousands of that country bent on seeing the world and, first, their Canadian neighbour. These tourists bring money with them which they spend freely, thus contributing substantially to Canada's ability to maintain her exchange position in New York, which in turn enables her to make purchases in the United States. The tourist dollar, like the quality of mercy,

is twice blessed: it blesses him who spends and him who receives; it brings prosperity to Canada in the purchase of tourist services, and it carries prosperity back to the United States in the purchase of services and commodities which Canadians otherwise would not be able to buy. But the most important thing about the tourist is not his dollar; it is his friendly curiosity about these people who are his neighbours. The impressions which he gathers he carries back to every corner of the Republic and, as in the case of local communities just discussed, he breaks down isolationism and contributes his strand to the web of international understanding. What is true of the tourist from the United States is also true of the tourist from Eastern Canada—the provinces of the Dominion which have contributed so greatly to the population of British Columbia. He is now coming in considerable numbers; with the improvement of certain gaps in the Trans-Canada Highway the movement will greatly increase. Moreover, the traffic will be two ways, and it will do the British Columbian no harm to see the magnificent fruitful prairies between the mountains and the Great Lakes (on which so much of his prosperity depends) and the vast agricultural and commercial resources of the East.

To all these results the highways of British Columbia are and will be major contributors; in the long range view they stand among the foremost of the assets of the province.

Ferry on Creston Flats, operated by side paddlewheels which are simple and efficient.

Australia's Northland Awakens

by HARRY REIDY
and WALTER GOODWIN

Coconut palm at Bathurst Island, Northern Territory

THE VERY NAME Northern Territory is, to most Australians, synonymous with vastness. This is natural enough, because the Northern Territory of Australia is a great empty land of 523,000 square miles, just a little smaller than the province of Quebec.

But these figures give no complete picture. The sense of vastness, which you feel when examining the Northern Territory, comes rather from the nature of the life there. It is a land of great distances and of never-ending sameness. It is a place where men own properties like Alexandria Downs, a cattle ranch 11,000 square miles in size or more than five times as big as Prince Edward Island. It is a land where your nearest neighbour often lives well over a hundred miles away, a land of mammoth floods and great dryness.

For many years the Northern Territory was a place of mystery, but the veil has been lifted and it faces a future full of promise. Before long, it may become one of the great productive areas of Australia.

The Northern Territory forms a panel between the States of Queensland, South Australia and Western Australia. It was once a part of New South Wales, and then of South Australia and it became Federal Territory when the States federated into the Commonwealth of Australia in 1901. Its capital is the now bomb scarred tropical seaport of Darwin, one of the only two towns of any size in the area. The other town is the picturesque meeting place of the outback, Alice Springs, in the Macdonnell Ranges, which is just south of exact centre of the continent.

For a long time, the Territory was regarded by many as a land fit only for the aborigines, but today important developmental schemes are being made.

Four features, which have been largely responsible for this changed attitude, are these:

1. The establishment of overseas air services makes Darwin the port of entrance to Australia for routes from England, Europe, India, the Netherlands East Indies and Singapore.

A glen of palms in the Macdonnell Ranges, Central Australia.

2. The linking of the Northern Territory's railways with the general Australian network will open up vast new areas.
3. The reorientation of the British Commonwealth defence plans following the war has altered both economic and strategic plans.
4. The fact that the millions of people to the north of Australia who have been living in sub-standard conditions constitute a growing potential market for Australian industries.

But these are not the only reasons why Australians are thinking more about their "empty" north. Australia has plans for a sustained influx of immigrants and if these are to be successfully absorbed new areas must be opened for closer settlement.

Then there is the important consideration of the aborigines. Australia's policy of administering territories provides for the progressive advancement of the interests of the native peoples, and a big proportion of the Australian aborigines live in the Northern Territory.

Australians will admit that the past record of economic development in the Territory has not been impressive. Actually, the war not only focussed attention on this little-known land, but caused the first big steps to be taken in its development.

When the Japanese invasion seemed inevitable, the necessity for fast transport routes and the housing of thousands of troops laid shining new roads throughout the Territory. New bores were sunk to expand the already great artesian water supply. New airfields were built and, for the first time in history, thousands of men from other parts of Australia examined this long-neglected section of the continent.

Before the war brought the bulldozer and other great earthmoving machinery to the Territory, the camel was used to build dams and make roads.

During the war, when Japanese invasion seemed inevitable, road making equipment and a corps of workers were rushed to the Northern Territory to tear strategic roads through the middle of Australia. These roads were Australia's "Alaska Highway".

Before the war, the situation in the Territory was this: of the 523,000 square miles, 192,000 were leased to 130 ranchers. The average property ran about eight head of cattle to the square mile. Experts now recommend subdivision of the leases, where possible, to enable closer settlement and to increase the output of the territory.

Topography and Resources

Most of the Territory lies in the torrid zone and there are three main divisions. The first is the coastal area, which includes the section down to the 15th parallel, or more simply, the land west of the Gulf of Carpentaria. This is probably not the best land in the country, but its high rainfall gives quick growth to most vine and root plants. Its rivers are navigable for nearly 100 miles for ships up to 100 tons. In this division, there is the great gold mining belt, which has yet to be fully exploited. Not the least of the possibilities of the coastal belt are the ideal conditions which it offers for afforestation.

The second division lies between the 15th and the 20th parallels and here are excellent cattle and sheep lands. The northeastern sector of this belt contains permanent rivers, but because of the size of the leases its full production potential has never been reached. South of the Pellew Island Group, which lies

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off the coastal section of this area, there are rain forests similar to those in New Guinea. These offer great possibilities for the establishment of a timber industry.

It is in this division that a complete new town is to be built. It will rise from the red soil 12 miles south of the township of Newcastle Waters, and will be known as "Elliot". Plans have already been prepared, blocks of land subdivided, streets laid out, and special areas selected for industries. Elliot will provide for an eventual population of 2,000. The reason for the new town is that the site is the junction of the stock routes from east and west. Thousands of head of stock converge there every year on their way south, so it has been decided to establish facilities for stockmen. Inspectors from government departments will be stationed in the town; garages and workshops are to be built, and there will be a hospital,

schools, sporting arenas, a business area and hotels.

The third division runs from the 20th parallel to the 26th. The rainfall varies from twenty to eight inches a year and the area is suitable for almost every type of primary industry from beef raising to citrus fruit production. Although there are few permanent rivers, the existing river beds are filled with sand and this forms an effective evaporation blanket for the water which seeps along fifteen to twenty feet below the surface. The central plateau of this third belt stands about sea level, with the town of Alice Springs as its centre.

It can therefore be seen that the Australian inland is not all desert, as some of its detractors have claimed, but the Territory does have about 150,000 square miles which are classed as desert. These are not areas of vast dunes in the Sahara tradition, but tracts

AUSTRALIA

Scale of Miles

of waterless rocky country which will probably be untouched for many years.

By 1944, there were 1,005,569 cattle in the Territory, an increase of 82,988 since 1939; 30,534 horses and 32,575 sheep. In the past twenty years cattle worth about $26,000,000 have been exported. It is estimated that the Barkly Tableland, which has about 30,000 square miles of grass downs with a regular rainfall, could carry 1,250,000 sheep, and other areas 3,750,000.

Large herds of buffaloes roam wild in parts of the extreme north. These are a type native to India and they were first introduced from Timor in 1825 to help to develop early settlements. When these were abandoned, the buffaloes wandered into the bush where natural food and water was abundant, and multiplied quickly. However, for many years hunters shot them for their hides until by 1920 they were reduced to an estimated 20,000. These have since multiplied.

Agriculturally, little progress has been made, although it has been proved that rice, tobacco, coconuts, tropical fruit, cotton and peanuts can be successfully grown, especially as at least three rivers, the Victoria, the Roper and the Daly, each with catchment areas larger than the Province of New Brunswick, can be utilized for irrigation projects. The future of the Territory is at present bound up with the pastoral industry, but the encouragement of mining will lead to wider development.

Up to 1940, total minerals won were valued at $13,000,000, of which gold contributed about $10,000,000. Other minerals were principally wolfram, mica, tin, copper, tantalite, silver and silver-lead.

Settlement and Administration

The first settlements were at Fort Dundas on Melville Island in 1824 and Raffles Bay on the mainland three years later. These were abandoned in 1830 after disease and attacks by aborigines had decimated the settlers. In 1838, following rumours of intended French activities in Northern Australia, another settlement was established at Fort Essington, just west of Raffles Bay. Bananas, sugar and citrus fruits were planted, an orderly little town was built, and there was optimism that it would prosper. It failed mainly because of disease, and was abandoned in 1849. For many years after that, the Territory lay deserted and undisturbed, except for occasional explorers.

Originally incorporated in New South Wales in 1825 as that colony expanded westward, it was annexed to South Australia in 1863. The following year a settlement was established near the present site of Darwin, and Darwin itself, formerly called Palmerston, was chosen as the capital site in 1864.

The transcontinental telegraph line, 2,230 miles in length, was completed in 1872. A railway was built from Darwin to Pine Creek, later extended to Birdum, 316 miles away, and Oodnadatta in the south was

Right page: — Anthills are a common sight in the north part of the Northern Territory. These are misnamed, because they are the homes of the wood-eating termites. The pictures show the most unusual hills, called "magnetic"; the termites always build these hills wafer fashion with the thin edges (inset) facing directly north and south and the broad sides east and west.

Left:—Central Australian aborigines, holding wooden spears and boomerang.

connected by rail with Adelaide, a line which the Federal Government subsequently pushed on to Alice Springs in the centre of the continent. However, the burden of the Territory proved too heavy for South Australia's resources, and it was transferred to the Federal Government in 1911.

The administration is at present in the hands of an Administrator responsible to the Minister for the Interior, who operates under ordinances made by the Governor-General, subject to the Federal Parliament. The Territory elects a representative to the House of Representatives, who takes part in debates, but has no vote, except on motions for the disallowance of any Northern Territory ordinance. The Administrator is stationed at Darwin, and there is a District Officer at Alice Springs.

The population by 1942 consisted of only 4,952 Europeans, approximately 740 Orientals, mostly Chinese, and about 14,488 known aborigines, including some 800 half-castes.

Of the aborigines, some 6,420 were nomads on the 67,244 square miles of reserves, 4,218 were in supervised camps, and 2,705 were in permanent employment. As some of the reserves are still practically unexplored, the

actual total of aborigines is hard to ascertain.

Broadly speaking, there are four classes of aborigines: the myalls, or those in their native state; the semi-detribalized; the fully detribalized; and the half-castes. Their care is the responsibility of the Native Affairs Branch, whose Director is a noted anthropologist. He works with the aid of district officers and native protectors, who have a wide and sympathetic knowledge of the aborigine and his problems.

Europeans are strictly forbidden to supply liquor to an aborigine or to trespass on native reserves, where the aborigines are encouraged to live their normal tribal lives. Many have never had contact with the white man, living today as have their ancestors for countless centuries. Some, indeed, are still regarded as dangerous. Those in employment, on the other hand, usually work on cattle stations, where they make good stockmen and drovers, while some work in the mining industry. Their work as police trackers is famous, and during the war they helped on many works associated with the army occupation.

Even aborigines living in towns, however, have yet to master the complexities of civilization, and the majority have little idea of the value of money. Payment for services is, therefore, usually made in goods, employers being required to feed, clothe and house the employee and his usually numerous relatives, also to issue a ration of tobacco. When payment in cash is made, the wage is banked for them, and may be drawn only if the protector considers that it will be wisely spent. Some aborigines, from long association with the white man, are good and efficient workers and can demand wages closely approximating those received by white workers. Patrol officers and protectors constantly inspect their conditions of work. There is no indenture system, and any aborigine is free to leave when he wishes. Most "go walkabout" (take a holiday in the bush) for about two months every year.

Civilized native families receive child endowment on the same scale as whites, $1.20 a week for every child after the first. Many are under the care of the mission stations, which receive an annual subsidy from the Federal Government for caring for and training them. Half-castes are the greatest problem, since they are not readily absorbed into the European population and are not wanted by the tribes. The Government pays the missions $1.10 a week for looking after each one, independently of any child endowment. Medical and hospital care equal to that available for whites is also provided, and the renowned Flying Doctor Service for those in outback areas responds to radio calls for aborigines as readily as for whites.

Excepting one or two isolated groups in other parts of the world, the Australian aborigines are probably the most primitive people alive today, their normal way of life resembling in many respects that of the early ancestors of the human race. In their native state, they are nomads organized into tribes, which remain in one place only so long as

Northern Territory aborigines fishing near Darwin have captured a stingray. Their canoe is fashioned from a log by stone axes.

Jay's Gap in the Macdonnell Ranges.

food and water supplies are plentiful. They do not understand that seed produces the plant, and have encountered no wild animals capable of being domesticated. Their main weapons are the wooden spear, the stone axe and the boomerang. Nevertheless, the aborigine is not degraded, either physically, mentally or morally. They are polite and fun-loving, and have a highly complicated system of tribal government, social organization and religious beliefs administered by the old men of each tribe. Magic and medicine men play a big part in their lives, and they observe strictly many ceremonies. The aborigines in the northern portion of the Territory are, on the whole, better built and more alert than those in Central Australia. The well-watered country of the north with its teeming game provides better living conditions, and there has been an infusion of Malay and other blood, which has resulted in increased stamina.

Northern Australian natives in corroboree dress. The totem pole is painted with ochre markings; the men, elaborately decorated, dance and march around the totems to the accompaniment of monotonous music and weird chanting.
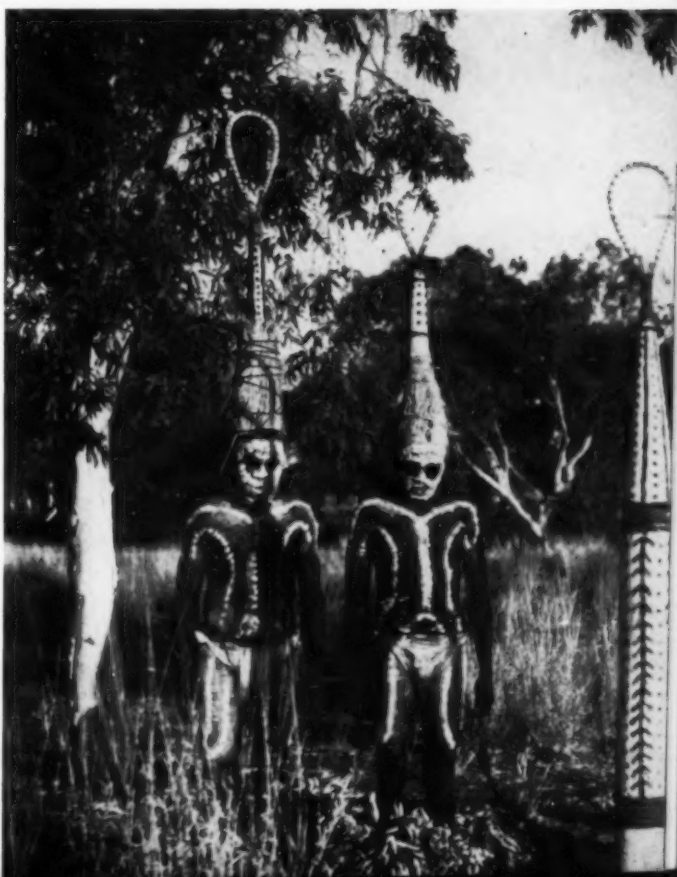
War and Post-War Development

On February 19, 1942, squadrons of Japanese planes from the north suddenly appeared over this vast, quiet land and Australia, for the first time in its history, experienced an enemy attack against its shores. Darwin was bombed repeatedly and many buildings destroyed, some 200 people were killed and another 400 injured, and the rest were scattered. The Territory, indeed all Australia, reeled under the shock, was stunned for an interval, then suddenly sprang to action. The war proved to be the Territory's turning point, for it entirely changed the outlook of Australia towards it. The bombs that fell on that fateful day emphasized ruthlessly that Australia's little-known, unprotected and isolated "Never-never Land" had abruptly become her vital strategic front door. Defence roads were constructed forthwith through the lonely interior linking Darwin with Alice Springs and Mount Isa, Queensland with Tennant Creek; many new airfields were laid down and existing ones improved; telephone communication was established between Darwin and the capital cities; the Australian Army took control, and a ceaseless traffic began to flow over Australia's "Burma Roads".

Moreover, the army planted big fruit and vegetable gardens in many areas in which intense cultivation was previously thought impossible. Water boring was carried out in many regions. Probably the most important result was that army occupation proved that the Territory could support a large population.

During the war, the Federal Government spent $50,000,000 between Camooweal, Queensland, and Darwin on water supply, power stations, wharf facilities, abattoirs and landing strips. The development of Darwin was linked with the irrigation scheme, and it is believed that progress will result if solid foundations are laid. Moreover, not only will post-war Darwin carry a substantial, permanent garrison to stimulate settlement in the surrounding country, but the post-war Australian railway plan provides for joining the Darwin-Birdum line to the continental system, and probably the completion of the north-south line from Darwin to Adelaide by spanning the 650 miles between Birdum and Alice Springs.

First post-war move was the appointment of a Northern Australian Development Committee, consisting of representatives of the Federal, Queensland and Western Australian Governments, to plan the development of Northern Australia in a co-ordinated way, taking particular account of the defence angle. The more immediate task of rebuilding Darwin was also begun. The Government took over about 22,000 acres held in about 600 private ownerships in return for claims for compensation in each case. On this land, a new planned town is to arise. New lease-

holds will be offered with all possible steps to prevent speculation. Most land unsuitable for residential purposes is reserved for military use, and areas for industry have been set aside. The basic centre of each residential unit will be the primary school, so situated that young children will be within ten minutes walking distance without having to cross a major road on the way. Darwin will be served by adult community and commercial centres for every 5,000 to 10,000 residents, each to include a community hall, cinema, library, restaurant, swimming pool and sports area. A town with an eventual population of 17,000 is envisaged.

The Northern Australian Development Committee is at work with a view to an increase in population, the welfare and development of the aborigines, an increase in production, and the best utilization of the land and other resources involved. One of its first tasks is to have made a complete survey of the resources of the north. It is concentrating particularly on those areas about which sufficient is known to indicate that development is possible. This approach will enable capital expenditure on developmental works to be concentrated in selected productive localities rather than spread over a wide area. Such areas are the Darwin-Katherine, Ord-Victoria River, Barkly Tableland and Burdekin regions. The survey

will pay particular attention to such matters as ecology, soils and pastures, minerals, and water supplies.

While the war was responsible for certain substantial constructional benefits in some areas, its effects in others were little short of disastrous. Besides enemy destruction, it left a legacy of deferred maintenance and disrupted industries. Roads and other public utilities must now be constructed, administration, social services and industries re-established. These urgent problems are being dealt with as speedily as possible pending the outcome of the survey by the Development Committee. Urgent attention is also being given to the disabilities of families and individuals living in isolated areas with a view to removing the hitherto serious deterrent to development—lack of social services and amenities. Steps are being taken to revive the pearling industry, and, besides the re-establishment of Darwin, the mining and pastoral industries and the possibilities of coal-mining and irrigation, hydro-electric and flood control schemes are receiving special attention.

These, in outline, form the policy and plans which should soon convert the Northern Territory from what too many formerly regarded as the backdoor of the so-called "Dead Heart of Australia" into a modern, flourishing entrance to an Australia attuned and alive to the realities of the post-war era.

Stratford-on-Avon

Historical and Architectural Aspects

by EDGAR W. PITT

PREFACE

To the world at large Stratford-upon-Avon is known merely as the birthplace of William Shakespeare. Pilgrims from the uttermost parts of the earth journey thither with the one object of visiting the Poet's home. So absorbed are they in their idea that they are blind to everything else. Yet—quite apart from its Shakespearean associations—Stratford is full of interest as a perfect type of old English

town that has pursued the even tenor of its way through the ages, undisturbed by the wars and turmoils of the outer world, although now and again the sound of battle has come so near as Evesham, Worcester or Tewkesbury. Even today Stratford retains in its older streets a wonderfully mediaeval aspect, while the most careless observer can scarcely fail to be impressed by the feeling of peacefulness which pervades its very atmosphere.

(1) At top:—The Gild Chapel and Almshouses

HISTORICAL SKETCH

The history of Stratford-on-Avon is singularly uneventful. The earliest settlement here was a Saxon monastery founded about the year 700, which stood on the bank of the Avon, on, or near, the site of the present-day parish church. It belonged to the Bishop of Worcester, and was confirmed in the possession of that see by William the Conqueror. Thus the Bishop was lord of the manor, i.e., the monastery and the houses of its dependants. At the time of Domesday, the population was less than two hundred. The monastery ceased to exist about that time, and henceforward Stratford became merely a manorial estate of the Bishop of Worcester and cultivated by his villeins. This lasted to about 1300 when the feudal system began to break down and the middle class came into being. The village at Domesday consisted of a group of buildings (one a water-mill) in the vicinity of the church now known as Old Stratford, or Old Town. By the time of Edward II the place had begun to take its present shape, the two main streets—one running from the Church to High Street; the other comprising Bridge Street and Henley Street—already having houses on both sides. Pre-Elizabethan records give us a list of streets (against which are shown their modern adaptations), thus:

Baugge Street...	Bridge Street
Grenehill Street...	Greenhill Street or Moor Town End
Henlye Street...	Henley Street
Rether Street...	Rother Street
Corn Street....	Chapel Street
Shepe Street...	Sheep Street
Swyne Street....	Ely Street
Tinkers Lane.	Scholars Lane
Heye Street......	High Street
Schoppe Row...	Middle Row, Bridge Street
Chyrche Street............	Church Street (occurs 1370)
Walker Street..........	Chapel Lane—Dede Lane (1359)
Mere or Mare Street....	(occurs 1368)
Wode Street............	Wood Street (in 1483)

When the inhabitans ceased to be dependent upon the lord of the manor, and became tenants paying rent for a house or land, or eventually freeholders by purchase, men of ability soon raised themselves above their fellows.

In Stratford one family arose which was destined to play a most important part in the development of the town. The first member of it, Robert de Stratford, was a well-to-do farmer. He is said to have founded in 1296 the Gild of the Holy Cross, an institution partly religious, and partly philanthropic. The Gild had its own altar in the north aisle of the church. It acquired much property in Stratford by gift from its members, so that it became the dominating factor in the life of the town. About 1420-28 the Gild erected for its own use the Gild Chapel, Hall, School and Hospital (Sketch 1), the fine group in Church Street which we see today. At the Reformation the whole of the Gild property was confiscated by Henry VIII, but was restored by his son Edward VI in 1553, when he incorporated the town.

Robert de Stratford had two sons, John and Robert, who, with their nephew Ralph, rose to high dignities in the Church. During the period when Robert was Vicar of Stratford, the streets of the town were paved. John de Stratford enlarged and partly rebuilt the Parish Church, where he founded a chantry to St. Thomas à Becket, with five priests. This chantry he endowed with houses and lands in Stratford and elsewhere. His friends added to the endowments, whilst his nephew, Ralph de Stratford, in 1351, built for the chantry priests a stone house, which building became known as the College, and the church was then entitled collegiate. It is worthy of note that the College was the only ancient domestic building of *stone* in Stratford, of which we have any record. The property of the College shared the same fate as that of the Gild at the Dissolution, but, like the latter, it was (with the exception of the College building itself) restored to the town in 1553. Thus it comes about that to this day almost all the old houses in Stratford belong to the Corporation, because they belonged originally to either the Gild or the College. To this fact, too, we owe it that so many of the old houses in Stratford have come down to us unspoiled by the hand of the modern builder. Another result of this past history of Stratford, which must surely be unique, is that every lease granted since 1553 is preserved in the archives of the Corporation. It is noteworthy that all repairs to the properties had to be done by the

(2) Tudor House, Garrick Inn and Harvard House, High Street

tenants only. They even had to rebuild when the premises were destroyed by fire.

One other family have left their mark upon the buildings of the town—the Cloptons. Members of this family were here from the time of Henry II till the eighteenth century. The most notable member was the first Sir Hugh Clopton, who amassed a fortune as a merchant in London, of which he became Lord Mayor in 1492. He was a great benefactor to his native town, where he built the stone bridge and greatly improved the roads. He rebuilt the Gild Chapel and the transepts of the Parish Church, and built the "Great House" (now the Shakespeare Hotel) in the garden of which "New Place" —Shakespeare's home—was erected.

Visitors to Stratford are surprised at the width of its streets, and the open space of the Rother Market. These are directly due to its past history. Compare Stratford with a town like Shrewsbury; there, the streets are narrow and the houses crowded together because the town was close to the Welsh border and therefore liable to attack. All buildings had to be enclosed within the strongly-fortified town wall. In Stratford, on the other hand, where the space available was practically unlimited, and the country level, the houses were built along the roadsides and by the river. The principal nuclei were the Bridge, the College and the Gildhall.

The occupations of the people of Stratford in the past, even as today, were and are concerned with agriculture, especially livestock. Brewing, under strict regulations, also was no insignificant industry.

The mills used for grinding appear to have been of three kinds: querns or hand-mills for domestic use; water-mills worked by the Avon and tributaries, of which the one by the church was most important; and horse-mills, such as one used for cider-making at the present day.

Yeomen occupied many of the larger houses, which can generally be distinguished by the wide openings at the side, through which a loaded wagon could pass into the yard. Even now there are extensive barns and outbuildings to the rear of most of the houses in the middle of the town.

As the buildings were mainly of wood with thatched roofs, they were liable to catch fire. Two fires which occurred in 1594-5, Wheler mentions in his *History of Stratford*. Two hundred dwelling houses and goods are stated to have been destroyed to the value of £20,000. The inhabitants were so reduced that the Corporation petitioned Elizabeth to remit subsidies and taxes, which she did and at the same time granted briefs empowering them to collect contributions from many of the counties and cities of the kingdom. On 9th July, 1612, fifty-four houses, stables and barns storing great quantities

of corn, hay, straw and timber amounting in value to £8,000 were destroyed. Another fire occurred in March 1640. Stratford was also visited by the plague, the most serious visitation being in 1564, when some two hundred and forty persons died of it.

The agricultural character of the town is further indicated by the old street names. Rother Street was where the Rother (red) cattle market was held. Chapel Street used to be known as Corn Street, and Chapel Lane as Dede Lane or Walker's (i.e. fuller's) Lane. There was a Bull Ring where the town hall now stands, both this and the opposite corner being open ground up to the time of Charles I. The corn market was held there —hence the above name—Corn Street.

Another indication of the agricultural character of Stratford is the fact that all tenements—dwelling-houses as well as barns, etc.—were described as consisting of so many bays. A bay was the space required for stalling a yoke of oxen—usually sixteen feet. In Stratford it was rather less—about fourteen feet.

ARCHITECTURAL NOTES

The following notes deal with that great deposit of (chiefly) domestic work covering the period from the early fifteenth century to the end of the seventeenth century—a period remarkably well represented in Stratford.

The close-timbered method of building continued to be used in Stratford from 1400 up to the days of Henry VIII; evidently timber was still abundant in the adjacent Forest of Arden. Of the second (Elizabethan) period, the "Tudor House" and Nos. 17-18 High Street (Sketch 2) are typical examples. Timber-framed houses were prevalent in Stratford from about 1420 to 1650, but the town is remarkable for the large proportion of very early timber buildings, more than half of them dating from the fifteenth century.

The third (Jacobean) type of timber house was prevalent throughout the seventeenth century. In these the timber frame consists of a series of square panels. In other towns those in the front gables commonly have

diagonal bracings shaped so as to form a central star in each—the Garrick Inn is an example—whilst the tie-beams of the gables and bargeboards are often ornamented with carving, the favourite designs being the Vine, or the Tudor Dragon. The edges of the main timbers are also often moulded. In Stratford, however, there are comparatively few houses of Jacobean type. Harvard House (Sketch 3) and 29 and 30 High Street, are examples, though the first certainly, and possibly all three, are actually late Elizabethan. The Jacobean is an elaboration of the Elizabethan development. It is characterized by an excess of ornamentation, and in its later phases it deteriorated; staircases, in particular, became heavy—almost clumsy.
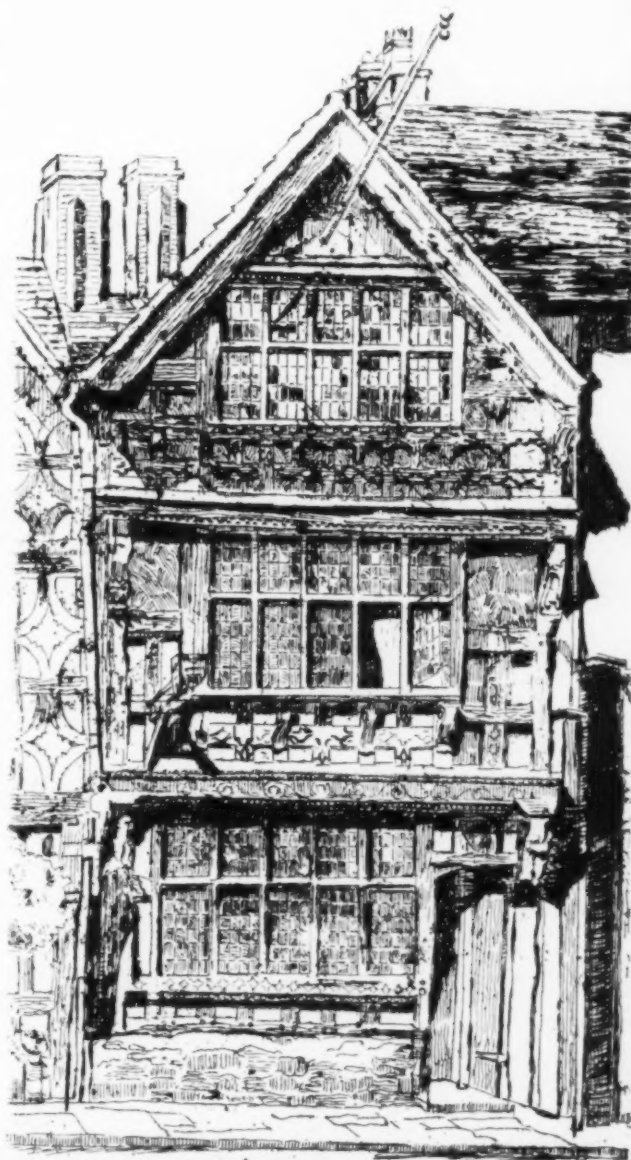
(3) *Harvard House*

(4) Left:—Mason
Court, Rother Street

(5) Below:—The yard
of the Windmill Inn

Mason Court, Rother St Stratford-on-Avon

EDGAR. W. PITT 1935.

Brick was little used in Stratford until late in the seventeenth century. Before that date it was employed almost exclusively for chimney shafts. Early bricks were much thinner than modern ones, measuring only about two and a half inches in thickness. Owing to their irregular shape, too, they did not course evenly, nor lie close together. Consequently the mortar joints were much wider than in modern brickwork, and this factor gives a character to these old chimney stacks. This is well shown in the stacks of the old building known as Mason Court in Rother Street (Sketch 4).

Examples of seventeenth century brick houses are the Anchor Inn in Bridge Street, Windmill Inn in Church Street (Sketch 5), and No. 5 Chapel Street.

There is a group of brick houses in Old Town and Church Street, dating from the time of William and Mary. In these the bricks are not handmade, but moulded. Consequently they are uniform in size and shape, so that they course evenly and lie much closer together than do Elizabethan bricks. Houses of this period usually have a billet-moulded cornice with deeply overhanging eaves.

Early 15th Century

At the corner of Church Street and Chapel Lane stands the hoary Gild Chapel which played such an important part in the past history of Stratford. Opposite the Chapel door (at the street crossing) stood the Chapel, or White Cross and a public pump, removed in 1595. Adjoining the Chapel is a group of buildings—viz. the Gildhall, Grammar School and Almshouses—all built by the Gild, the Almshouses first, then the Gildhall, and lastly, the Grammar School (Sketch 1).

The Almshouses are a long range of timber framed building adjoining the Gildhall—close timbered throughout and divided up into a series of bays, all alike. Each bay is marked by a stouter post which had a simple pilaster and bracket-head (Sketch 1). Each bay consists of two rooms—one on the ground floor and one above. The two floors

are quite distinct from one another, and do not communicate. The lower series, occupied by old married couples, are entered from the street or garden; while the upper—occupied by single or widowed old people—are entered from a corridor which runs the whole length of the building in the rear, and is reached by a short flight of steps to the right and left of a central passage entered from the street through a large doorway. The whole of the rear has been rebuilt in brick in modern times. Originally there was probably an open corridor with balcony over, supported on pillars. With the exception of the bay next the Gildhall, the timbers of the upper storey will be found, on close examination, to bear the carpenters' old marks. The fact that the bay next to the Gildhall has not these on its timbers shows that it was not built at the same time. Evidently it was an afterthought, and was inserted to fill the gap between the two buildings. It is not in line with the other Almshouses either at roof, eaves or base. Yet it is so exactly like the others in detail that it must have been added immediately after the Gildhall was finished.

The large doorway in the centre of the Almshouses appears to have been inserted at a later date, for to the left of it is a doorway the same size as the others, which was evidently blocked up when the larger one was made.

Each of the principal posts marking the bays has had a plain pilaster on its face, cut out of the solid, with a semi-octagonal head and base, the latter collared. The outlines of these pilasters can still be traced in many instances, though they had been hacked away when the whole face of the building was plastered over a century ago, which was removed and the buildings carefully restored by Mr. Charles Flower in 1892.

The Gildhall was built, as we've seen, very soon after the Almshouses—probably about 1420. This applies only to the main building reaching from the right of the entrance archway as far South as the Almshouses. At first, therefore, it was a detached

building. The adjoining Almshouse—connecting it with the others—was inserted in 1427-8, while the chamber connecting the Gildhall with the Tower of the Chapel was inserted after the latter was completed by the bequest of Sir Hugh Clopton in 1496.

The windows have thick oak bars, and probably originally had no other filling— glass being rare in England until the reign of Elizabeth.

The main room, entered now through a modern porch, is a long, narrow and rather low chamber (Sketch 6). On the far end wall is a somewhat defaced mural painting representing the Crucifixion, with the Blessed Virgin Mary one side and St. John on the other. This design was the seal of the old Stratford Gild of the Blessed Virgin Mary and St. John the Baptist. Below these paintings can be seen the mortice-holes for the timbers of a low dais on which the master and officials sat at the annual Gild feast. On this dais also, the players which visited Stratford in Elizabethan days used to perform.

At the southwest corner of the Hall a low doorway with battered inscription over it, dated 1619, leads to the Counting House, which was also used as the Council Chamber. It has good Jacobean panelling, while over a fireplace is a large painting of the Royal Arms, which was painted in 1660. Half-way up the winding staircase in the corner, a small room juts out, called the Muniment Room, because some time ago a number of sixteenth century documents were found in it.

Above the Counting House is the so-called Armoury, with intersecting moulded ceiling-timbers, originally panelled, but now open to the roof. Both these rooms are Jacobean and therefore of later date than the main building.

The Over-hall (now known as the Latin Schoolroom) corresponds in size to the Great Hall beneath it. Formerly two chambers it is now one fine long apartment. After 1553 it was used as the Grammar School, but it was only in 1896 that the above mentioned unsightly partition was removed. The massive roof-timbers, hewn by the adze from the solid trunk, are im-

pressive by their size and purposeful simplicity. It will be noticed that this building, like the Almshouses, is constructed in a series of bays, each marked by principal roof-timbers.

At the farther end of the Latin Schoolroom is a small chamber of irregular shape. It stretches across the entrance archway and porter's lodge to the Chapel Tower. This was the insertion before mentioned.

The Almshouses and Gildhall have been described in detail because they are typical of so many other fifteenth century buildings in Stratford. Indeed there is probably no other town in England with so large a proportion of buildings of this period. The Gildhall; the Falcon Inn opposite; Shakespeare Hotel; several houses in Sheep Street and Wood Street; Shakespeare's birthplace; and part of Hall's Croft, all date from the latter half of this century.

The 16th Century

"Tudor House", High Street and corner of Ely Street (formerly Swyne Street) was built just after the fire of 1595 by John Woolmer, a prominent townsman (Sketch 2). An earlier house stood on the site which was occupied by the Master of the Gild from 1459 till 1497. The timber frame on the ground floor has been almost obliterated by the insertion of modern shop-windows, it was originally close-timbered like the lower half of the storey above. The next storey has the timbers disposed in two series; the lower one consists of uprights set close together, surmounted by a long transom which forms the sills of the windows, and runs the whole length of both street frontages. Above this is a series of cross bracings which—ignoring the windows—forms a row of double diamonds one inside the other, each crossed by a vertical and horizontal timber. The upper storey exhibits a series of panels with curved bracings. These are called bell-bracings because each pair encloses a bell-shaped space. At each corner may still be seen the sloping timber which outlines the original roof which was gabled.

Originally each storey overhung the one

below on both frontages, but the shop windows in High Street have been built farther forward and have obliterated the overhang here, though it is still visible on the Ely Street side. The overhang at the lower corner is supported by a dragon-beam resting on a corner-post. This post has rather crude Tudor ornamentation. Above it is a bracket consisting of carving of a bearded face surrounded by a ruff. The corner of the storey above rests on a pair of brackets; one of these towards High Street bears a face above the carved scroll, whilst the other is in the form of a crouched figure with arms clasping its knees—a really wonderful example of mediaeval craftsmanship. To right and left are several other scroll-shaped brackets with acanthus leaf carvings. Altogether, this house is a fine example of the work of a craftsman who has been given free play for his imagination and skill. Some of the timbers on the Ely Street front still exhibit the carpenters' marks, whilst on one of them the series-mark—a circle—can be seen.

The 17th Century

The Garrick Inn, next door, stands on ground owned by the Gild of Holy Trinity, and which thus came with other property to the Corporation, who still own it. They restored the building about the years 1924 and

1925. The framing and panels have already been referred to. There are curious carvings on the brackets of the corner-posts; that on the left appears to be a bear erect with one forepaw holding a wheel above its head. The central chimneystack of stone is still in situ. The house, together with that adjoining, was burnt down in 1595.

Harvard House (Sketch 3), next to the Garrick Inn, is named after John Harvard, founder of the great American University, and now the property of that institution. A fact worthy of note is that beneath the front window is inscribed "T. R. 1596 A. R.", for Thomas and Alice Rogers, parents of Katherine Rogers, who married Robert Harvard of St. Saviours, Southwark, London, the parents of the above John Harvard. Harvard House is a remarkably fine and ornate example of late Elizabethan timber work. The entire frontage is covered with a profusion of carved ornament, to such an extent that scarcely any of the timber has been left plain. Even the window frames are covered with incised ornamentation, but this is almost all modern. The principal design is a flat-faced fleur-de-lis in high relief, and this is employed even underneath the window-sills—a unique feature. The bracket-heads on the ground floor are very curious, the one to the left is a talbot erect, collared with


(6) The main chamber, Gildhall
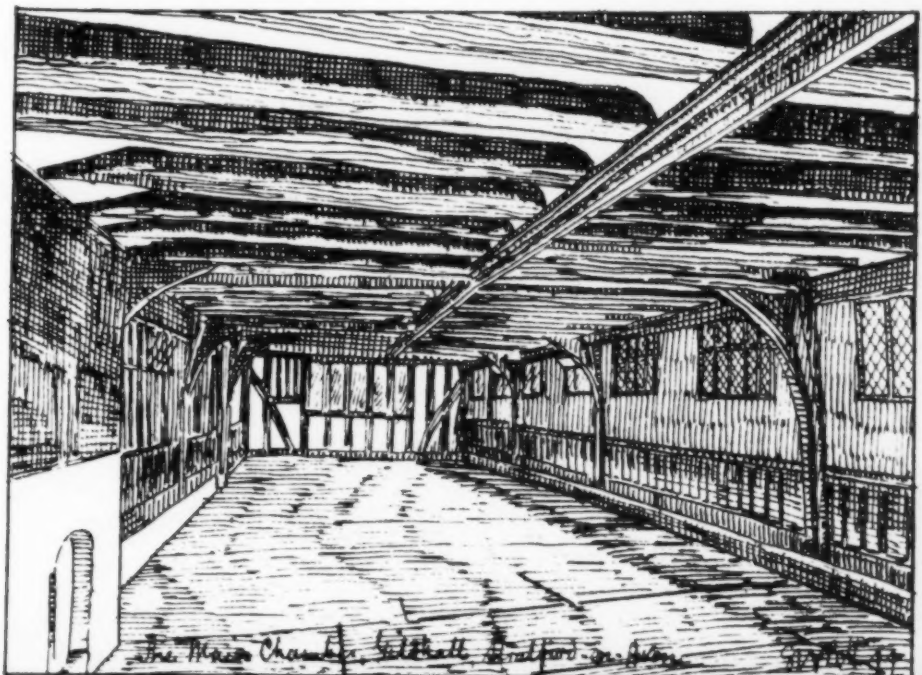
right paw resting on a staff; while that to the right shows a bull's head (indicative of the proprietor's trade as a butcher), above which is a mutilated female head, possibly that of Queen Elizabeth. The rest of the frontage of the ground floor, including the window and door, are modern restoration. The windowsill on the third floor front, besides other carved ornamentation, has beneath it a row of brackets carved with human faces. The whole of the work is of Jacobean character, and if it were not for the carved date, 1596, we should be inclined to date the building somewhat later. As a matter of fact, the house is not all of one date. The middle portion is older than the rest, and a study of the timber frame reveals distinct signs of alterations to the structure. It is evident that Thomas Rogers rebuilt the front of the house after the fire of 1595, which had destroyed that part, and extended the back at the same time. The middle had escaped destruction. The parlour upstairs is wainscoted with beautiful oak panelling, surmounted by a frieze with thumb mouldings and billet mouldings, whilst between the sections are exceedingly handsome fluted pilasters reaching from floor to ceiling. The whole is in situ. Here also is a fine fireplace with carved overmantel displaying fleur-de-lis, lion rampant, and Tudor rose.

Mason Court, Rother Street (Sketch 4), is the most quaintly picturesque bit of domestic architecture in Stratford. To describe it in words is futile. The deep overhanging roof in the centre, with the queer little window tucked away beneath it, reminds one of an eye with beetling brow. Equally indescribable is the curiously twisted roof-corner running up to the chimney stack. Two wings extend backwards in the rear, so as to partly enclose a courtyard. This gives the impression that the place may have been an inn. It should be noted that originally both wings overhung in front, but the right-hand wing has been altered, late in the sixteenth century, by the ground floor being advanced flush with the upper.

The Windmill Inn, Church Street (Sketch 5), is a brick-fronted timber building with dormer windows, and is apparently of Cromwellian date, though probably some of the earlier buildings are incorporated with it. In 1720 there was an inn in Church Street called the "Dog and Duck"—possibly this same house. The present Windmill Inn was held in 1599 by John Rogers and is then described as a "tenement on street (blank) bays (probably four) tiled; on backside two ranges of three bays, one tiled, one thatched. Cross barn of four bays (three belong to him) with lean-to two bays thatched. Garden 54 yards length." From this description it is evident that there were very extensive out-buildings at the rear and these covered so much ground that they reduced the length of the garden by 30 yards.

The above are but a small proportion of the many examples of the architecture, chiefly domestic, of Stratford of the sixteenth and seventeenth centuries. However, the examples described are among the finest and most important.
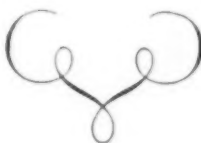
The End of the Portage

by S. C. ELLS

PORTAGING has long constituted an integral feature of exploration and initial development in Canada's newer lands. And tumplines and pack-boards have not yet been laid aside.

Proper balance and adjustment of packing equipment are helpful, but on rough, wet or hilly trails the portaging of bulk loads or large canoes is no work for weaklings. Legendary tales persist of men who carried loads of 500 to 700 pounds' weight, and on the LaLoche portage, during the early regimes of the North West and Hudson's Bay Companies, two "pieces", equivalent to 180 pounds, was the minimum weight assigned to each man.

Incidentally, the writer has always considered that, where trail conditions permit, fast walking is desirable. The cause of fatigue is due primarily to supporting the load rather than to the actual walking itself. Consequently, the sooner one reaches his destination the better. But even with light loads of 100 to 150 pounds, the gleam of lake or stream at the end of a portage is always a welcome sight.

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EDITOR'S NOTE-BOOK

The two scholarships (for $250 each) of The Canadian Geographical Society for the McGill University Geography Summer School were awarded to Miss Margaret Vant of Winnipeg and Mr. Louis Edmond Hamelin of Quebec. Miss Vant has taught for many years in the Winnipeg public schools and last year was assigned to the social studies department of St. John's Technical High School, where experimental work is carried out. Mr. Hamelin is a student at Laval University, whose ambition is to become a professor of geography on the faculty of social sciences at that University.

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Lyn Harrington—See biographical sketch in May 1947 issue.

Robert J. C. Stead, who contributes the "Highways of British Columbia" article to this issue, has long been well known in literary and publicity circles in this country, and has a background which gives him exceptional qualifications for writing on geographical features of Canada. Born in Ontario, he spent his boyhood on a homestead farm in Manitoba, graduated into newspaper work, joined the publicity staff of the Canadian Pacific Railway at Calgary, and was quickly advanced to the position of publicity agent in charge of that company's extensive colonization publicity, which embraced Canada, the United States, the British Isles, and certain areas in Europe. When the Dominion Government established its Department of Immigration and Colonization at the close of World War I he was appointed Director of Publicity of that Department. With the amalgamation of federal departments in 1936 he was made Superintendent of Information and Resources Publicity for the Department of Mines and Resources, with the special task of publicizing the national parks. Mr. Stead's official duties have taken him many times into every province in Canada. He retired last year and is now devoting himself entirely to literary work. In addition to numerous official publications Mr. Stead has written eight novels dealing with life in Western Canada, and three volumes of verse.

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Harry Reidy and Walter Goodwin are two Australian writers who have collaborated to produce the interesting article on the Northern Territory which appears in this issue.

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E. W. Pitt—See biographical sketch in July 1946 issue.

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COVER SUBJECT:—A few yards west of Banff station in the Rocky Mountains, glacier-fed Bow River turns sharply to the southeast and, close to Banff Springs Hotel, cascades as Bow Falls to greet travellers from every continent with the song of the waterfall. Here in graceful bend the Bow unfolds her peacock fan in welcome to the Spray River, her principal tributary on the south, and courses majestically eastward between Tunnel and Rundle Mountains. In the middle distance Mount Brewster and beside her Mount Norquay keep watch.   Ansco colour photo by G. M. Dallyn

AMONST THE NEW BOOKS

Scientists Against Time by JAMES PHINNEY BAXTER
(McClelland & Stewart, Toronto)

Most people engaged in scientific pursuits have heard it said that it takes a full generation for the layman to catch up with the advance of science. On reading this book, one becomes convinced that the lay reader is going to be left even farther behind. The advances on the scientific front in World War II were so numerous, so far-reaching, and so complex that no scientist can ever hope to come abreast of them except in his own sphere.

During the war most people became aware that new and amazing scientific devices were in daily use, and some of us realized that without them and their inventors we most undoubtedly would have lost rather than won.

In this book many of these inventions are described in sufficient detail to make their operation comprehensible, though the continuing need for secrecy in some fields of research leaves an occasional blank. At times one tends to get lost in the "alphabet soup" of contractions and other linguistic short cuts, and there are even new terms (new to some at least) which are not defined at all.

Occasional solecisms, such as "dove" mistakenly used as the past tense of "dive", and "tactic" used as though it were the singular form of an imaginary plural "tactics", mar what is otherwise an excellent account of the development of such things as radar, loran, the proximity fuse, and the atomic bomb.   D. LEECHMAN